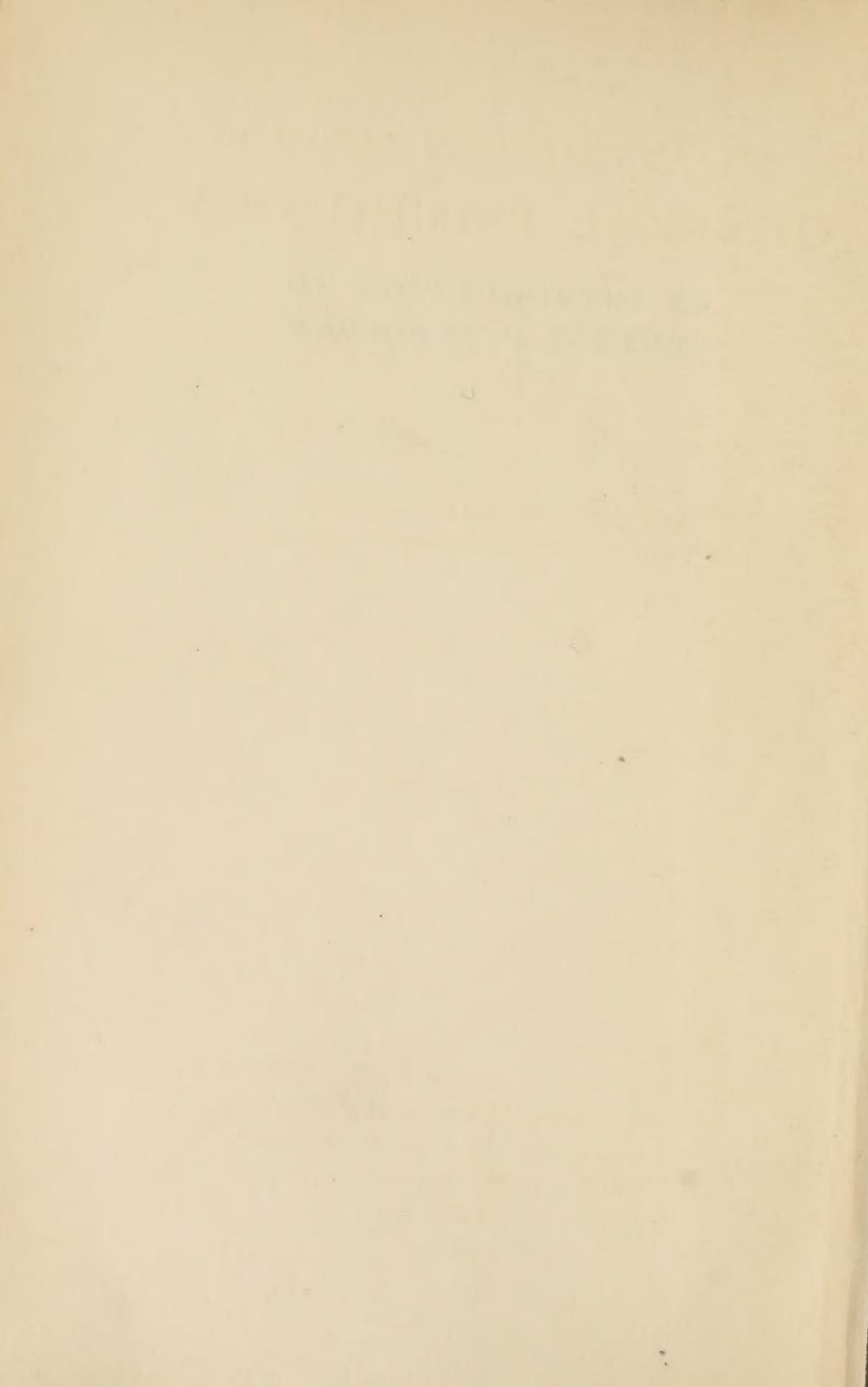




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AN INTRODUCTION TO
GENERAL PSYCHOLOGY



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AN INTRODUCTION TO GENERAL PSYCHOLOGY

BY

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TO
THE MEMORY OF
OSWALD KÜLPE
MY FRIEND AND TEACHER

PREFACE

THE preface of a book is usually an apology for its existence. This one is no exception to the rule. The large number of already available text-books in Psychology makes pertinent the question: Why another? In attempting to justify the appearance of this one, I would first call attention to the need of a growing science, such as Psychology, for constant revision, and the envisagement of its problems from various angles. This has doubtless been the occasion for many of the texts which we already have.

The chief motives for the writing of the present book were two. The first of these was to supply a general elementary text-book which would meet the demands of the average student beginner a little more adequately than has been done hitherto. After ten years' experience in teaching a first course in Psychology, I have become convinced that the mode of attack usually followed fails to supply the student with the sort of introduction into the science of mind that will enable him, on the one hand, to connect his Psychology with everyday life, and, on the other hand, to apprehend the bearings of this science upon Philosophy, Education, Sociology and Biology.

It has been my experience that so much time was consumed in the study of the nervous system, and of the experimental data of sensation and perception, that in a brief course no adequate consideration could be given to mind as a whole, and to the important topics of personality and character. To introduce a student to the study of Psychology is one thing, and no doubt the detailed study of psychophysiological data, with their appropriate laboratory exercises, is a most satisfactory means to this end. But the function of Psychology in an undergraduate college course is another thing, and is not purely departmental. The average student does not go beyond the first brief course. He does, however, frequently elect further work in Philosophy and Education, Sociology and Biology. In coming to these subjects he should bring with him psychological conceptions of a general sort that will be useful to him.

It is the consciousness of this need which has supplied the first motive for this book. How well I may have succeeded, it is beyond me to say. Many defects will doubtless be apparent to the critical reader. I can only hope that they may not prove serious enough to invalidate the purpose which I have had in view.

The question was continually pressing in the treatment of each topic: How much and how little should be said? In my endeavor to keep the book within such limits as would make it practicable to cover the ground completely in a one-term course,

the result may appear, perhaps, as too condensed and schematic. If this be the case, I can nevertheless invoke the willing coöperation of the instructor in providing for his discussions the necessary addenda in the way of illustrative material which he may deem important.

I have purposely avoided all diagrams, references to literature and practical demonstrations. But these also will be readily supplied by the instructor, if the need be felt.

The second motive for this book was my conviction that the time has come when we must modify some of our psychological principles and conceptions, with reference to the more recent investigations of the thought-processes. This has offered a difficult problem, and one which it would be impertinent to regard as adequately solved. It might well be contended that our present knowledge is all too incomplete to justify the incorporation of such data in a general textbook. Were it not that they have such important bearings upon psychological interpretation, I should agree in this. But for one who is convinced that new principles of interpretation are now demanded, it is no longer possible to teach the old Psychology, in which sensation and association are the chief foundations.

Believing that purposive direction and imageless contents are facts which must be increasingly dealt with in modern Psychology, I have not hesitated to incorporate them into this book, and to use

them as suggestions for a systematic point of view. I have tried, however, to avoid the dogmatic tone, and to present the facts as impartially as I could.

In this connection I wish also to say that my convictions rest chiefly upon my own investigations. While I owe much to the works of Binet and Woodworth, and above all to my colleagues of the "Würzburg School," I question if I should have reached the firm conviction which I hold, were it not for the investigations carried on in my own laboratory. I mention this fact, not only to defend myself from the possible charge that a sense of collegiate piety is the true occasion for this attempt to establish the results of my erstwhile colleagues and friends at Würzburg, but also to protect them from being involved in the mistaken assumption that this book is in any sense an authoritative presentation of their views.

I am indebted to so many sources for the material of my work, that it would be difficult, without an extended catalogue, to refer to them all. In the first instance, my debt to Professor Oswald Külpe is very great. Not only have I received my chief inspiration from him, but he has also assisted me by going over the complete outline of the book after its first draft was written. His valuable suggestions and criticisms have resulted in many alterations and the inclusion of considerable additional matter. For the lively interest which he has taken in the work, and the opportunity which

he has afforded me for detailed discussion of all the important issues involved, I am sincerely grateful.

I wish also to acknowledge my obligations to the teacher under whose guidance I received my first introduction to the study of Psychology. I refer to Professor E. B. Titchener. Although the standpoint from which I write is not the one accepted by him, I am always gratefully mindful of the opportunity for broad and thorough orientation in psychological methodology afforded me at Cornell University. If any merit attaches to the systematic form of my work, I feel that it is directly attributable to the influence of Professor Titchener. Furthermore, I have profited largely by his writings and by the personal discussions which he has been good enough to undertake with me.

Among literary sources, I could mention many, but the character of this work does not seem to warrant bibliographical references. For the trained psychologist these will be obvious enough. For others it is not, perhaps, a matter of importance. I cannot, however, refrain from mentioning my obligations to the writings of William McDougall, and especially to his volume on *Body and Mind*, which I have found most stimulating.

To three other friends a word of special and sincere thanks is due:—First, to Dr. Shepherd Ivory Franz, who has revised my chapter on Insanity; second, to Dr. Henry J. Watt, who was

kind enough to read the first draft of the MS., and to offer many valuable suggestions for its betterment; and last, to my colleague, Professor George Herbert Clarke, who by his critical reading of the completed text has managed to inject into it whatever grace of diction and style has been possible.

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Part I

THE PROBLEM OF
PSYCHOLOGY

CHAPTER I

THE OBJECT OF PSYCHOLOGY

1. Psychology as a Science

THE object of psychology is the study of mental happenings. Like the natural sciences, psychology finds its subject-matter in a certain domain of facts. These facts are either themselves conscious experiences or are concerned with them. The primary interest of psychology consists in as complete a description and analysis of experience as may be possible. But there are also other interests involved, without which psychology could hardly attain scientific standing. Just as the science of life, or biology, must study the physical nature of the living organism, so must psychology correlate mental events with the physical conditions of the body which experiences them, and with the environment which provokes them. This treatment of mental happenings in relation to their physical conditions is termed *psychophysics*.

The study of mental happenings implies still more than this. Our science is not yet complete when we have analyzed and described all our mental events, and have correlated them with the physical conditions provided by the body and its environment. A pure psychophysics of this sort would place all experience within a system of physical events. The continuity of consciousness would

then appear to be completely dependent upon these physical events, psychology would cease to be considered an independent science, and the only object in studying experience would be to set problems for the physicist, the chemist, and the physiologist.

There are scientists who accept this view and who regard psychology merely as a dependent and subordinate province of biology. Some of them contend that psychological facts are without causal efficiency. They believe that the only scientific problem which is worthy of consideration in this domain is the problem of behavior:—what the organism does, and why. There is even a tendency to dispute the scientific status of consciousness. Now, we cannot deny that the problem of organic behavior is a scientific problem of great importance, and one which has direct bearings upon psychology. For instance, the content of an animal's consciousness cannot be directly communicated to us. We must therefore study its movements if we wish to determine its capacities. But it does not follow that we shall be able to understand these capacities without assuming the presence of mentality in the animal. And even though there be indications that certain forms of behavior are completely explicable in terms of the animal's physical nature, it does not follow that man's consciousness is a useless and gratuitous adjunct, without which he would be able to act quite as naturally as he now does.

In any event, the science of behavior in this narrower sense is not psychology, and our primary interests here are in mental contents and operations. We therefore describe our science as one that deals with mental happenings, — not merely with contents, but with operations and processes in the complicated pattern of which mental elements may be isolated with more or less definiteness and precision.

2. Its Chief Lines of Investigation

From this point of view it will appear that our study includes three main lines of investigation, which we may summarize as follows:

1. The description and analysis of conscious contents.
2. The correlation of the physiological processes which accompany or interact with consciousness, and likewise of the physical events within and without the body which operate as exciting causes upon these physiological processes.
3. The discovery of the laws of mental activity which will explain mind as a whole, by establishing the relations of mental events to one another and to their physical and physiological correlates.

In what follows we shall not find it desirable to hold these different lines of investigation rigidly distinct. On the contrary, it will be more helpful to us to treat them in their natural setting of close interrelationship. It may be well, therefore, be-

fore proceeding further, to enlarge a little upon our brief summary.

Every science has for its object the study of a group of facts, together with the conditions of their occurrence and the relationships existing among them. It is this principle of scientific procedure which we have endeavored to express in the distinctions drawn above between psychological content, psychophysical correlation and the laws of mental activity. We might state the matter in another way by using the terms *structural*, *psychophysical* and *functional* to express these three phases of psychological study. The study of the mind's structure would aim at discovering the elements to which all consciousness may be reduced. The study of psychophysics would endeavor to correlate these elements with the physical factors within and without the body which serve as *stimuli* for processes in the nervous system. It would also inquire into the nature of such nervous processes and their bearings upon consciousness.

The importance of this phase of inquiry is evident when we consider how close the relation of consciousness is to nervous activity. It is well known that defects of the nervous mechanism of the body, occasioned by disease, or injury, or by the more or less temporary influence of certain drugs, are frequently attended by mental derangement. The loss of sensibility, the incapacity to react normally and the various mental aberrations which produce insanity are all attributable in large

measure to such defects of the nervous system. Furthermore, there is the important fact of the conscious *threshold*, which requires a psychophysical interpretation. Briefly stated, this term indicates that a certain minimal intensity of nervous activity must be secured before consciousness is aroused. Lesser intensities, sufficient to excite the nerves, yet fail to provoke consciousness. Nor must the intensity of stimulus be too great. There is an upper as well as a lower threshold of consciousness, and neither can be absolutely fixed in any special case. A third point which indicates the importance of psychophysical investigation is revealed when we consider the large number of bodily activities, both inherited and acquired, occurring apparently without consciousness. Yet many of these may become conscious, and others have important bearings upon consciousness at a later time.

These three considerations, (1) the dependence of consciousness upon a normal nervous activity, (2) the thresholds of sensibility, and (3) the facts of unconscious, reflex or automatic, behavior, are sufficient to indicate that a complete explanation of mind is impossible without some reference to the physical and physiological correlates which constitute nervous activity. Indeed, so important and so far-reaching are the results of this interaction of bodily activities and mental happenings, that many psychologists have believed it possible to give a complete and satisfactory account of

mind by the analysis and description of conscious structure, when aided by psychophysical correlations. This, however, is not the point of view adopted in this book. We shall, therefore, treat mental activity as a third phase of our study, and shall endeavor to show that mind involves processes which are not merely mechanical in the sense that the physical and chemical processes of the nervous system presuppose, but which are in a real sense *purposive* in their determinations.

We have alluded to this third phase of our study as *functional*, but to avoid ambiguity we shall not employ the term further in this connection, because "functional psychology", as ordinarily understood by English and American writers, does not necessarily admit such purposive determinations, but often refers merely to the "functions" of psychophysical interrelationships. In order to distinguish clearly between psychophysical processes and the processes which obtain between mental factors we shall refer to the latter as *mental acts* or *activities*. Let us also emphasize at this point our previous references to physical stimulation and the nervous processes as *correlates* of consciousness. This permits us to maintain that the conditions which explain the appearance of consciousness are not entirely physical and physiological, but are also in part, at least, mental. The consciousness with which we have to deal appears in a physical setting, and is in a large measure con-

trolled and determined by this physical setting; but not entirely so, because the laws of physics do not permit an adequate explanation of that unique feature of mental happenings,—a feature which has its analogue in all manifestations of life,—namely, its *purposive aspect*.

CHAPTER II

THE NATURE OF CONSCIOUSNESS

3. What is Consciousness?

WHEN we ask ourselves the question: What is consciousness? we are plunged at once into the very centre of the problem which psychology has to solve. It is clear, therefore, that this question cannot be adequately answered in the opening paragraphs of our volume, because its answer forms material for the entire book. Nevertheless, in approaching any domain of science one must seek a path, and the suggestions for our guidance must come from the knowledge we already possess. Consequently, we are forced to give some provisional answer to the question: What is consciousness? if only for the purpose of indicating which way we have to proceed in order to reach the psychological domain.

The most obvious answer is that consciousness is experience, and that experience constitutes the things of the world when these things are regarded in a certain way. Let us take as a concrete example the desk at which these words are being written. This desk, as a concrete object in the world of things, is made of oak-wood. It has certain dimensions and weight. It suggests the ingenuity of the designer and the art of the carpenter; it has a certain commercial value, and a certain utility.

These, among other facts, belong to the desk as an object in the world of things.

As facts of experience all these things are viewed differently. The oak-wood is primarily something to be seen and touched. That is, it appeals to one through the senses. Its dimensions and weight may also be estimated in sensory terms, when one is able to refer these sensations to previous experiences of analogous nature. It is memory that makes this possible. The wood is called oak because it resembles wood previously seen and touched to which that term has been applied. Such experiences may be recalled, and *memory images* from the past substantiate the judgment of the present. Thus the experience of texture, size and weight is not merely sensory, but is also in part imaginal.

But knowledge of the desk as an object of the world of things is not complete in the sensations and images which it provokes. There may also be *affections* involved,— pleasure or displeasure. These have no direct relation to the object as a thing. They belong entirely to the mental attitude of the experiencing subject. He is pleased or displeased, or neither, for reasons which must be sought in his peculiar mental make-up.

Furthermore, the judgments of which we have spoken, the estimate as to the nature of the wood, size and weight, together with the further facts concerning design and construction, commercial and utilitarian value,— these are all objects of

thought, and, as we shall see, have their origin in a distinct set of mental activities and products.

Sensation, image, affection, thought, these summarize the experiential or psychological content of an object, which in the world of things may serve as basis for mechanical, commercial or economic consideration.

4. Its Transitive Character, and the Need for Analysis

Another important fact concerning the general nature of consciousness is its transitive character. Consciousness flows on in a temporal sequence of events which are more or less separable and distinct. As we observe it, the flow is not entirely continuous, for at least the regularly recurring periods of sleep seem to interrupt its continuity. It is this fact which makes it difficult to explain mind as a mere causal sequence of conscious events. Even if we agree that conscious elements are but abstractions, and the real contents of consciousness are always *processes*, as some psychologists describe them, we are forced to seek for other processes, of which we are not fully conscious, in order to bridge such gaps as we find, for instance, in sleep. We have good logical grounds, therefore, for defending our right to analyze the conscious flow, in an endeavor to understand both its structure and its activities.

It is a fundamental principle of logic, that all explanation rests on a relating of terms, and it is

only by analyzing consciousness that we shall be able to arrive at terms which can be so related. A further corollary of the logical method of inquiry insists that the terms shall be as simple as possible. Our aim, therefore, must be to carry our analysis back to terms which are not further reducible. Now, it is not contended that in this ideal aim we shall be entirely successful. The science of chemistry rests largely upon the application of this method, yet recent research concerning radio-activity and kindred phenomena has revealed the fact that the chemical elements are not ultimate, as they were once supposed to be, and one speaks now of 'electrons' and 'corpuscles' as the most fundamental constituents of matter. Similarly in psychology, it is at present impossible to state that the elements our analysis may adduce are in any absolute sense the ultimate terms with which our science must for all time be content. This, however, does not make our provisional conclusions less important, any more than the recent results of chemistry have deprived the chemical atom of its scientific value.

5. The Unity of Consciousness

A general consideration of the nature of consciousness reveals other facts, which will serve to guide our later explanations. In the first place, consciousness is always *unitary*. The separable contents which constitute a moment or a series of events are always related to one another in a unique

manner. Usually, this means a common reference of all these elements to the experiencing subject. *I have* the sensations, images, affections and thoughts constituting my experience. The intimate relationships which bind these together into a unitary whole are not merely relations from part to part, but also involve a personal reference. This is known as the subject-object relation. The fence which I see before me, or the idea of the tariff legislation which I entertain are not simply objects of experience, but they are also objects of *my* experience.

It is a matter of dispute whether or not a true self-consciousness is always involved in every experience. Those who maintain that it is seek here the foundation for conscious unity. But others deny that we are always conscious of self. In many of our everyday experiences we appear to be entirely immersed in the objects which we perceive and the things which we are doing. Furthermore, in some extraordinary cases, the consciousness of self is markedly altered. In certain nervous diseases, the patients complain that they are no longer themselves, and dreams of normal individuals have been reported in which the experiences seemed to belong to another. It has not been clearly shown, however, that consciousness can ever be completely detached from some degree of subjective reference. The question, therefore, is still open.

Without forcing the issue as to the invariable

presence of self-consciousness as the fundamental tie which binds experience into a unitary whole, we may at least note the fact that in addition to the objects of experience there is always present some consciousness of mental activity in *having* the experience. This additional consciousness, which cannot be described in terms of sensation, image, affection or thought, is yet too little understood to be definitely assigned to its proper categories. We must, therefore, be content to note the existence of conscious mental activities and leave to future investigation the task of defining the various modes in which objective experiences are arranged and ordered into unitary wholes.

But let us be clear regarding our terms. What we have called the *objects* of experience, and classified provisionally under the four heads of (1) sensation, (2) image, (3) affection and (4) thought, are the *contents* of consciousness. By this we mean that every concrete experience is made up of elements of these four sorts. When one studies any conscious state for the purpose of finding out what it contains, these are the things that come to view. Sometimes one finds all four classes represented, while at other times some class or classes may be absent. This analysis of conscious contents will be the subject of Part II of this book.

In addition to the contents of consciousness, there are also aspects of mental happenings to be taken into consideration, which constitute the *active* side of mind. These mental activities are

of two sorts: conscious and unconscious. The conscious mental activities are those which emanate from the subject or ego, the 'personal reference', as we call it; although, as already noted, we cannot be certain that self-consciousness is an invariable adjunct. Speaking more generally, we may say that these activities are summed up in our various attitudes of striving, seeking, willing, appreciating and the like, together with the opposite attitudes of passivity or dissent. The important point is that we are conscious of our attitudes as well as of the matters which we apprehend. As a recent writer has expressed it, we must "emphasize the distinction . . . between experience as experienced and experience as experiencing".

But there are also unconscious mental activities. This indicates at once that the term *mental* is not coextensive with *conscious*. Mentality involves not only that which is conscious, but also that which may be conscious in future. It is impossible to define the limits of consciousness with any degree of accuracy. We can be more or less conscious of any given thing, and by imperceptible gradation that consciousness may pass below the threshold into the realm of the physiological. Some mental activities are, therefore, completely unconscious. This use of the term unconscious is generally accepted. Whether or not unconscious activities should be termed mental, depends upon the influence they exert upon future states of consciousness. Such physiological re-

flexes as are involved in the automatic processes of digestion, circulation and respiration may have no mental value whatever. On the other hand, a weak sensory impression, such as the sound of a distant bell, can pass unnoticed at the time it is heard, and yet the impression may be sufficiently lasting to provoke recurrence as a memory-image which is noted at a later time.

There is another aspect of the unconscious which is more a subject of debate. It is maintained by some that mental activities of a complicated sort go on below the threshold of ordinary consciousness. We have, they say, not only a conscious mind, but also an unconscious mind, which is capable of retaining the impressions that come to us in the course of experience and also of doing mental work upon them, shaping them and ordering them against a future opportunity for their use. Thus, it has been maintained that the unconscious mind possesses capacities which transcend those of the normal waking state, such as the ability to communicate directly with other minds, both carnate and discarnate. Many more or less fanciful theories are based upon this supposition. Some regard the soul as hindered in its expression by the bodily mechanism. Hence the consciousness which we know is but an imperfect reflection of the real nature of the soul which guides our destiny. Below the threshold, however, it makes use of its wider-reaching capacities to build constantly a truer and more perfect personality. From time to time,

as opportunity is afforded, this unconscious self is manifest by intuitions of truth and a progressive development of character. But the complete expression is not attained until in bodily death the soul has thrown off its mortal garment.

Somewhat less speculative is the conception that subconscious mental activities are carried on within the boundary of consciousness, as differentiated from the purely physiological. Below the threshold of complete consciousness, the conscious entities continue to perform their characteristic tasks. Thus many features are injected into our waking states concerning the antecedents of which we have had no conscious knowledge. It is quite probable that this is in some degree true, although we are not at present in a position to study these questions to any considerable extent. In sleep, for instance, it is possible that consciousness does not vanish; the contents, however, are no longer grouped and joined together in the way in which we are alone able to hold them in unitary sequences. Consequently we lose them, not so much for lack of ability to note them as they come, but rather because we are unable to establish the necessary relations which enable us to remember them.

Both conscious and unconscious mental contents and activities are set in a framework of psychophysical capacities and abilities. If we may be allowed to give a somewhat restricted meaning to these two terms, *capacities* are *innate*, and *abilities*

are *acquired*. Taken together, these capacities and abilities constitute the foundation of an individual's intelligence and behavior, and are sometimes termed his *dispositions*, mental and physical. We are predisposed towards certain mental contents and certain conscious and unconscious (*i.e.* physical) activities. We also acquire in the course of experience modifications in disposition which make us peculiarly ready for certain acts and contents. These, taken together, constitute the *faculties* of mind, and it is in the expression of these faculties that we must seek the explanation of conscious unity.

6. The Stages and Span of Consciousness

Another important fact which a general consideration of the nature of consciousness brings forward is the existence of *stages of consciousness*. These are the modes of presentation of an object to consciousness. They indicate the amount and kind of mental work done upon the content which is presented. Three and even four of these stages have thus far been distinguished.

The first stage is that of *simple presentation*. The object is merely given. It is simply there, but nothing further can be stated of it. Simple presentations of this sort are constantly coming and going in the stream of mental happenings. They may possibly leave memory-traces, though this is often denied, but for the most part they are not reproduced, and, except in contributing

to the fullness of any moment of consciousness, they have no appreciable influence upon mental life.

The second stage is attained when we *note* the object given. At this stage we are *aware* of the object's presence. It is received by a conscious mental act, though no further work is done upon it at this stage. The many things we observe, without attempting to place or understand them, belong to this second stage in the process of presentation. Our awareness of the object makes more certain and lasting the memory-trace which is formed than is the case when objects do not pass beyond the first stage of presentation.

The third and culminating stage is attained when the object is *established* in consciousness. We are now aware of it as *known*. To be established in consciousness is to be understood in some degree. The object means something. This is what we call full consciousness of an object. The range of understanding is, of course, not indicated. The object may be one of which we have very little knowledge, and yet be very clearly and definitely established in consciousness.

A fourth stage of consciousness sometimes precedes the stage last mentioned. This is the stage of *potential knowledge*. The object is not yet fully established in consciousness, but the possibility of establishing it is already indicated. Thus we often say we know a thing when what we really mean is that we are conscious of a certain assurance

that if we undertook to do so we could establish it. All that is actually presented, however, is the object plus certain incipient mental activities of which we are conscious. This constitutes the stage of potential knowledge when such a differentiation can be made. But it frequently happens that we pass, without a perceptible differentiation of stages, from the awareness of an object directly to its establishment in consciousness.

When the question is raised as to the *span* of consciousness, or how much can be experienced at one time, our reply is dictated by these facts of the conscious stages. The question is equivocal. It means different things, according to the stage of consciousness which has been attained. At the stage of simple presentation, an indefinite number of things may be present. At the stage of awareness the range is limited to a small group, usually not more than five or six. At the final stage of established facts there is but one thing in consciousness. The mental activities have shifted from the receptive attitude of *awareness* to the reflective attitude of *meaning*. The contents, which may be numerous, are unified by the meaning which commands the situation.

The problem as to the span of consciousness is, therefore, not simple but complicated. It is not answered by a mere enumeration of objects, but only by reference to the mental activities involved in the presentation of these objects. Occasionally, the objects themselves give us direct

and extended information regarding their origin and the course of their existence in mind. The interesting transformation of a strange object into a familiar one can often be traced through the gradual accretion of associative adjuncts and the modifications in attitude due to a variety of affective situations. But there are also changes and developments in which the course of evolution is not clearly indicated in the object as presented. Here we must often theorize on the basis of indices of change which can be noted. Explanation is thus read into facts which of themselves might remain eternally a mystery. In cases of this sort we but follow the example of the objective sciences when they establish ether currents and vibratory phenomena to explain certain facts that would otherwise be but unrelated events. The assumption of unconscious mental activities is always tentative until the warrant for such an assumption becomes generally recognized. But the testing of such tentative assumptions is a matter of scientific progress, as it is in all other branches of science.

CHAPTER III

METHODS IN PSYCHOLOGICAL ANALYSIS

7. Introspection and Retrospection

OUR next general consideration deals with the methods of psychology. Such a consideration is demanded because of certain peculiarities and difficulties which arise in the observation of psychological facts. Exact measurement, which plays so important a part in natural sciences, is applicable only to a limited degree in the study of mental happenings. It is largely for this reason that the mental sciences are considered apart from the 'natural' sciences. In place of *observation* as the means by which the material for mental science is collected, it is usual to speak of *introspection* as the distinctively psychological method. The most striking difference between the two methods is revealed in the assumption that observation has an 'objective' reference, indicated by the fact that natural science deals with objects of the outer world; whereas psychology is introspective, since its objects are primarily a matter of individual experience.

A closer view, however, will show us that these assumptions are not tenable in any strict sense. The psychologist makes observations in the same manner in which the physicist or the biologist does. In studying the comparative brightness-values of a gray surface and a red surface, his obser-

vations are quite as direct, and objective, as those of a physicist when he determines experimentally the focal length of a lens. The only important difference concerns the interpretation of the results of the two experiments. The physicist directs his observations upon facts which are completely conditioned without reference to the observer. The psychologist, however, is always dealing with facts in which the objective conditions, *i.e.*, the operations external to the observer, form but a part of the complete conditions for the mental event. This, however, means only that the conditions governing a psychological fact are more complex and less readily isolated than those of a purely physical fact. There is no difference in the principles of observation involved in the two cases. In observing the transit of a star, the astronomer assumes that the star is moving through the heavens with a velocity which can be expressed in a simple mathematical equation. It cannot well be supposed to proceed by fits and starts, with occasional pauses intervening. Hence, if he finds that different observations have brought varying results, he knows that the observers and not the star are the cause of this. In the case of the psychologist, however, it is precisely these peculiarities of the observer which constitute one of his most pressing problems. The objective control exerted by the mechanical uniformities of nature are only in part the determining causes of his results. He must not only consider the observed facts of many individuals

under constant objective conditions, but he must also study the process of observing, both as a psychophysical problem and as a problem of mental activity. The first of these supplementary problems leads, as we have seen, to the study of the correlations of physical stimuli and physiological processes with the consciousness under consideration. But the second, which aims at the nature of mental activities, requires him to supplement his direct observations with memories. In addition to the simple observation of conscious events as they occur, he must also study the antecedents and consequents of these events. In short, he must study mental happenings as they are conditioned by past experiences, as they occur in complicated states of consciousness, and as they bear upon issues which may be intended but not yet realized.

We may conclude, therefore, that the mere observation of a psychological event is as direct as any other observation, but that such observations do not furnish us with a complete understanding of mind. When we are dealing with mental processes in their natural setting, we are often forced to allow them to run their courses, and make our observations *afterwards*, that is, retrospectively. It cannot be denied that this puts many difficulties in the way of psychological investigation, difficulties of which the natural sciences are fortunately free. Our memories are notoriously fallible, and at best are but incomplete records of what has taken place. Considerations of this sort have led many psy-

chologists to regard the whole introspective — or, more properly, retrospective — procedure as altogether too indefinite and inexact for scientific purposes. They are those who counsel the study of behavior as the only scientific method of approaching mind, and who would reduce the work of our science to the most exact registration of direct observations and reactive movements of the organism.

But we need not put the matter in so pessimistic a light. In spite of all difficulties in the way of exact retrospective records, the fact remains that memory is a very useful adjunct to our scheme of life, and no man doubts that, though fallible, it is in a high degree truthful. Were it otherwise, we should be at a loss to explain the reliance which every man places upon it, — in the main, with such good justification. The capacity of the memory for giving a faithful report of past events is simply one of the problems with which psychology must deal, and it is not impossible to devise experiments in which the objective or perfectly ascertainable conditions are so important that an accurate measure of the capacity of the memory may be secured and subjected to detailed study.

8. Direct and Indirect Observation

Two methods, then, must be used in the analysis and description of conscious contents. These are *direct observation*, which can be applied to such events as possess relative permanence and are thus

capable of isolation; and *indirect observation*, which is required in the case of events that do not possess a sufficient degree of permanence to be isolated from their natural setting without fear of modifying their essential nature. The distinction between these two forms of observation is, however, not an absolute one. All degrees of permanency and independence are attributable to conscious contents. Those which possess these characteristics in the highest degree are, as already stated, most completely determined by the physical nature of their stimuli. Those which possess them in the least degree are most dependent upon physiological processes and the laws of mental activity. But all manner of intervening cases occur where the conditions are partly internal, and partly external to the nervous system. Sometimes an indirect observation can be made immediately after an experience has occurred, in which case a very high degree of validity attaches to the observation, since the conscious event does not at once disappear, but continues for a short time as a direct memory-image, whereby its nature is hardly altered at all. At other times the event has its existence in a complex of other happenings, and it is necessary that the complete process should run its course in a natural manner in order that it may be fully developed. In such cases, our indirect observation partakes of the nature of retrospection, or a revival of the experience after it has been completed.

When our methodology has become more perfect it is quite possible that such indirect observations can be dispensed with. Since there is no hard and fast line which separates the direct from the indirect method of procedure, it is simply a question of introspective ability to observe the event in question when it occurs. At present, we do not know enough about the separable qualities of these events, as they occur in a complex setting, to make such an isolation possible. We are at the stage of prospecting, rather than at the stage which allows of definite discovery. We must first have accurate descriptions of complicated states of mind in which contents and mental activities are mingled together, before we can proceed to an adequate analysis of these contents and acts. After we have established the categories of experience for which we now search in our prospecting, we shall be able to analyze our events and discover the elements in a much more direct manner. At present, indirect observation serves to indicate these elements, but direct tests are necessary before they can be definitely established.

9. Special Methods

Aside from the direct and indirect methods of examining consciousness, there are several other methods extensively used in the study of psychology. There is the method of the behaviorist, to which we have already referred. This is the method of observing the behavior of living organ-

isms, — men, animals and even plants. The exact observation of behavior under conditions that can be rigorously controlled provides a field of experimental work which has great possibilities and promises psychological data of much value. Even occasional observations, which cannot be brought into the laboratory for exact control, may have a considerable scientific value. Thus the behavior of an individual or a group, under the stress of extraordinary emotional excitement, has often been described and the results corroborated. The novelist gives us such descriptions, which we accept as true indications of human conduct and character. The numerous anecdotes of animal behavior are less trustworthy, since we cannot appreciate so fully the analogous states of the animal mind. Furthermore, it is comparatively easy to study the activities of animals, because the conditions are readily capable of control. The animal is less complicated than the human, and most of its mental processes can be excited normally in the laboratory.

Child psychology involves a mixture of introspection and behavior-research. In the very young, we must, of course, rely entirely upon observations of behavior, but as the child learns to speak, we may supplement our observations by questions bearing upon the mental processes which have taken place.

The genetic method is not essentially different from this mixture of observed behavior supple-

mented by introspective reports, except that it extends beyond the individual to the race. We may trace the evolution of behavior in the child as he proceeds to manhood. This is correlated with his physical development. We are also afforded comparative data by the study of races at different stages of cultural advancement, and by the historic remains of primitive ancestors. Much data of this sort is afforded us by zoölogical research. Our problem is to trace a psychological evolution as counterpart to the physiological evolution of living beings.

Among the special methods which are fruitful in psychology may be mentioned certain aspects of experimentation. Both the direct and indirect observations which we have mentioned, as well as the exact study of behavior, are best pursued under experimental conditions. We may distinguish two kinds of experiment, according as we direct our inquiry upon experience or behavior. Among the special types of behavior that have been found significant is the study of changes of pulse, respiration, volume and muscular strength, which attend experiences of varying orders. A special type of experiment bearing more directly upon experience is that which deals with the 'artificially narrowed consciousness' of the hypnotized subject.

Two kinds of non-experimental method are also pursued in the name of psychology. The first of these is the rational philosophic method of studying mind, which proceeds deductively upon the

basis of general philosophical assumptions, and attempts to give mind its proper setting in the universe. A second non-experimental method concerns itself with expressions of mind such as are discoverable in historic remains, literature, art, customs, language, etc.

10. Interpretation

It is evident that in all these methods a very important feature is the *interpretation* which is placed upon the data secured. In order that the interpretation may be correct the data must be adequate. We must control the observations of one person by the observations made under the same conditions by others, and also by observations of the same person made at different times. Since mind is so complicated and variable in its expressions, the exact control of the objective conditions under which the observations are made cannot be too strictly enforced. Many observations bearing upon the same event are desirable in order that an average result may be obtained, which in some measure lessens the discrepancies arising on account of individual differences and varying degrees of practice.

11. Two Conditioning Laws: Problem and Direction

It is important to note that all adequate observation is influenced and made possible by two fundamental laws of mental activity. The first of these laws refers to the *problem*. All mental

processes are set in operation by the problems which we have consciously before us. If we are attempting to equalize the brightness-values of a gray and a red surface, a certain mental attitude is aroused, which makes the events relevant to this observation stand out from among the numerous irrelevant experiences which accompany it. The problem and the sensory stimulus for the activity form a mental complex, which operates as a general condition for the events that follow.

The second law refers to the *direction* which the process takes. It is supplementary to the first law, for not only is a problem set, but the operations that follow are controlled by the aims implicitly contained in the problem. Thus the occurrence of relevant events is dictated, while other events, which occur for various reasons, are ignored when they do not agree with the aims set by the problem. This directive selection is not only operative in cases of direct observation, but is also very influential in the revival of important and relevant material in indirect observation. These are not the only laws of mental activity which operate to make observation of mental events possible, but they are the two which are most important, and they will suffice to give us an understanding of the point of view adopted in this book.

Part II

THE ANALYTIC FACTS
OF MIND

CHAPTER IV

VISION

12. Sensation in General

WE are now prepared to undertake an analysis of consciousness,— to attempt a survey of the structural elements with which mind carries on its operations. The feature of consciousness that strikes us first and most of all is its power of revealing the world in which we live. Its revelations are based to a large extent upon elements known as *sensations*. This we infer by observing that certain points of our bodies are sensitive to physical stimulation. An examination of these sensitive points or areas affords a safe beginning in our study of sensation. We shall be greatly helped in determining these points and areas by an understanding of the physiological nature of the body and of the nervous system, both central (brain and spinal cord) and peripheral. Many of these sensitive sites, of course, are at once apparent to us,— for instance, the eyes, the ears, the mouth, the nose and the skin. It is a commonplace that man has five senses, known as seeing, hearing, tasting, smelling and touching. But to be exact this popular account must be extended, for the analysis is too general, and we have reason to suppose that it is incomplete. We may, however, begin with a study of these five senses, which will afterward carry us into a more complete survey of our sensory experience.

13. The Conditions of Vision

Seeing is a process which involves physical, physiological and psychological facts. The information contributed by our eyes concerning the world lying about us must in the first place depend upon certain physical stimulations which this outer world supplies. The physicist tells us that these are ether waves issuing originally from luminous bodies, but which are also reflected in various ways from other bodies not themselves luminous. Thus we see not only the sun and the lamp, from which the light rays issue directly, but also the moon, the wall and the tree, which only reflect the rays of the sun or some other source of light. But in order to see these things it is also requisite that we should possess a physiological organ which is peculiarly attuned to this sort of stimulation, and which accordingly responds in certain definite ways to the light rays that penetrate it. The eye is such an organ, and its manner of response to the light waves determines in a large measure what we shall see. If by reason of disease or injury to its delicate structure or its nervous connections, it fails to respond, we have the condition of blindness. This is not, as some people suppose, a continual *darkness* for the sufferer, but simply an *absence* of every sensation which we characterize as visual, either light or dark. There are many instances, too, in which individuals have abnormal vision due to optical defects of one sort or another, as the cases of

near-sighted, far-sighted and astigmatic vision, attributable to structural variations in the parts of the eye. Again, and more strikingly from a psychological point of view, there are the cases of color-blindness, in which individuals fail to discriminate certain colors which the normal eye sees distinctly.

14. The Classification of Visual Sensations

Psychologically considered, the vision of the normal human eye can be analyzed into two great classes of sensation, the *colored* and the *colorless*. All colors may be classified according to their redness, yellowness, greenness and blueness, but no color can belong to more than two of these classes, and the two to which it may belong must be adjacent in the series named, with the additional provision that blue be regarded as adjacent to red. Thus we have before us a simple scheme for classifying all possible colors. As a result we may distinguish *principal* colors and *intermediate* colors. The principal colors are the four above mentioned: *red*, *yellow*, *green* and *blue*, which attain their special prominence by reason of the fact that we can say of them, as we can say of no other colors, that no one of them resembles any one of the other three. Each one of these is *sui generis*, and thus a truly elemental form of experience. It is impossible to describe one of these in any terms save those which are synonymous with the color itself. The intermediate colors, however, always

resemble two and only two of the principal colors. Thus, intermediate between the reds and yellows, is a series of gradations which, beginning with a red having just a tinge of yellow, varies with constantly increasing amounts of yellow through the tones of orange until the color approaches pure yellow. Similarly, these gradations are found between yellow and green, between green and blue, and finally between blue and red, thus completing the circle. A fairly adequate illustration of this fact is given in the solar spectrum, which results from the refraction of a ray of sunlight by a prism, the different waves constituting the ray of white light being bent at different angles, in accordance with their wave-lengths, so as to produce a band of colors which represents these gradations. Lacking only are some of the gradations that occur between blue and red, the two ends of the spectrum being psychologically incomplete.

The colorless visual sensations in their turn present a simple series of gradations from *black* to *white*. Black and white have not the absolute significance which attaches to the principal colors, because black and white are but relative terms in a series of grays. A maximum degree of whiteness might be assumed, but it would be impossible to determine what it is, because with increased illumination we finally reach a stage where it is no longer possible for us to regard the object on account of its dazzling brilliancy. With blackness, on the other hand, we might suppose that this

could be obtained in an absolute degree by the simple method of excluding light rays from the eye. But this is not the case, for what we see after we become adapted to our perfectly dark surroundings is not black, but a dark gray. It is evident, then, that black and white are relative terms, which apply to a series of gradations in gray, the limits of which it is impossible for us to fix with any degree of accuracy. Still, we cannot disregard the fact that black and white are commonly accepted as psychological opposites. Despite the difficulty of attaching either term to a concrete experience which is absolutely fixed, these extremes remain the most characteristic features of the colorless series. Gray, from which they are both in a sense derived, is a vague term in comparison. The black-white opposition is so firmly established in experience that we shall continue to characterize the colorless series by reference to its extremes, rather than by its common quality of grayness.

To make our usage unambiguous, we must describe the colorless series as gradations from black to white through intermediate grays, just as we proceed from red to yellow through intermediate tones of orange. The fact that we also pass through a series of gradations in brightness is another matter. *Brightness* is attributive to the elements of black, white and their mixtures. The brightness-degree varies, in the main, with the progression from black to white. But this is not always the case. We do not hesitate to refer to the white snows and gray

skies of winter, although the snow is always much darker than the sky.

But brightness is not merely a characteristic of the colorless series. It applies equally to all visual sensations. Thus the two series of colored and colorless sensations are related. The principal colors which we have analyzed and described vary through their intermediaries. They may also vary in brightness, by becoming lighter or darker. In describing a color, then, it is not only necessary to determine which of the four principal colors is presented,—whether it be a pure color, or, if it be an intermediate color, which two principal colors are involved,—but we must also determine its place in the brightness-series, whether it be lighter or darker than some arbitrary standard which we may erect. Nor does this exhaust the possibilities of analysis and description, since it is also possible for a color to vary while its color-tone and brightness remain constant. We can have more or less of the color without any necessary change to brighter or darker. This last variation is referred to as the degree of *saturation*, and variations of this order occur whenever a color is mixed, so to speak, with grays which are lighter, darker or of an equal degree of brightness. We can also attribute saturation to the colorless series, meaning here the degree in which a black, white or gray is free of all color-tone.

Summarizing, we may say that the black-white sensations vary mainly in their degrees of brightness

and saturation. Colors, however, vary in three independent ways: (1) by gradation of color-tone through intermediaries towards their adjacent colors; (2) by gradation in brightness, becoming lighter or darker; and (3) by gradation in saturation, that is, admixture with blacks, whites or grays. In this third case they may become lighter or darker, or remain at a constant brightness. Any one of these variations can be made independently of the others. The only fixed points in these variations are (1) the ideal point of purity which exists for each color at one definite degree of brightness; and (2) the limiting points at which the colors in their variations of saturation and brightness approach the colorless series by extreme lightening or darkening, or the admixture with any other degrees of colorless visual sensation.

15. Visual Adaptation and Contrast

Two other important facts presented by the visual sensations may be discussed under the heads of *adaptation* and *contrast*.

Adaptation signifies a certain instability of visual sensations, which is expressed by the law that *all steadily fixated blacks, whites and colors tend towards a neutral gray of medium brightness*. Thus colors lose their saturation and their extremes of lightness or darkness, while blacks and whites tend towards an intermediate degree of brightness.

Contrast signifies the reciprocal effects which exist between visual sensations. This is partially

expressed by the law that *for every color another can be found which, when mixed with it in proper proportion, will result in complete cancellation of both colors and the appearance of a gray sensation.* Colors which possess this reciprocal relationship are known as *complementaries*. Roughly speaking, the complementary pairs of principal colors are blue and yellow, red and green. But this is not strictly true in the case of the last mentioned pair, for in order to effect a complete cancellation between red and green a small amount of blue must be added. Contrast-effects in colors may all be classified by reference to this law. In the colorless series, where there are, of course, no true complementaries, there exists nevertheless a similar reciprocal relationship between the extremes of black and white.

Visual contrasts are of two sorts, *simultaneous* and *successive*. In simultaneous contrast we find a peculiar heightening effect which is produced whenever we look at two areas whose sensory quality differs. This effect is to render the lighter of the two areas lighter, and the darker one, darker. In addition, if one or both of the two areas be colored, the complementary colors are *induced* from one area upon the other. Thus, the proximity of a blue and a gray causes the gray to become yellowish, and the blue to become more blue. If the blue and gray be of the same degree of brightness, these color-effects will be most conspicuous, otherwise the darker of the two will become darker, and the

lighter will become lighter, in which process the enhancement of color may be interfered with, or entirely set aside. Other conditions which enhance contrast are (1) nearness of the contrasting surfaces, (2) the elimination of contours or boundary lines between them, and (3) the increase of saturation in the inducing sensation.

When any two colors are contrasted, the complementary of the one will tend to be induced upon the other. If blue and yellow are thus contrasted, the effect is to enhance both colors. If a difference in brightness also occurs, however, this will operate adversely to such enhancement, since the lighter of the two colors, say yellow, will tend, by contrast in brightness, to become yet lighter, which means that the yellow must suffer somewhat in saturation, while the blue, becoming darker, will also suffer in a similar manner. Assuming equal degrees of brightness, the complementary colors will be those most conspicuously enhanced through contrast.

In the case of non-complementary colors the results are complicated by induced color-admixture. Let us take for an example the contrast of red and yellow. Assuming equality of brightness, the yellow will induce its complementary, blue, upon the red surface, and in mingling an intermediate color will result, namely, a red with a bluish tinge. But the complementary of red which is induced upon the yellow is not the principal color, green, but an intermediate color, bluish-green. The green component adds itself directly to the yellow to give it

a greenish tinge, but the blue component, being antagonistic to yellow, tends towards its cancellation. The result is a greenish yellow, the saturation of which is slightly decreased rather than enhanced. It is of such contrasts as this that we say one color has 'killed' another.

Successive contrast results when a visual stimulation, which has continued until some degree of adaptation has set in, is removed. Under such conditions, the complementary color and opposite brightness become spontaneously effective. We become adapted through wearing blue glasses, and no longer detect the blueness of our surroundings. But when the glasses are removed, we find the world bathed in a glow of yellow. As we shift our gaze from one object to another, the brightness and the color of each object at which we look are in some degree determined by the brightness and color of the object at which we have just ceased to look.

These after-effects may also be projected before us, as images, and when the stimulation has been sufficiently definite and intensive, many interesting effects are produced. There is the simple *negative after-image*, as it is called, which gives us the complementary color and opposite brightness of the original. We also note that color and brightness are independently variable, with a strong tendency towards fluctuation. Thus, we become acquainted with *positive after-images*, in which either the brightness or color of the original, or both, may be reasserted without the attendance of the normal

stimulus. To secure a positive image the stimulus must be intensive. These positive effects are usually brief, and occur primarily before the negative image forms. But under favorable conditions fluctuations of considerable duration may be set up, which give us alternate bright and dark images, and a shifting color, variegated tones of which succeed one another in a manner described as the 'flight of colors'. In the main, these changes may be reduced to order when we consider the independence of the black-white and color series. Positive and negative effects of brightness combine with and modify the original and complementary effects of color. It is found that the dark image is more effective for the blues and greens, while the light image enhances the reds and yellows.

We may enlarge slightly upon this last fact in partial explanation of the differences noted between daylight and twilight vision. In bright daylight it is the reds and yellows which are most conspicuous. These colors suffer less in saturation when subjected to a high degree of illumination than do the other two principal colors. It is for this reason that they are termed the 'warm' colors. The 'cold' colors, blue and green, are, on the contrary, less affected by decreased illumination, and are therefore the only colors which are strikingly effective at twilight.

The causes which underly these facts of visual sensation are in part physical, and in part physiological. Some of them are well understood, while

others are subject to conflicting theories. As our present purpose is limited to a survey of the more general aspects of mental contents and activities, we must close with this brief account of the elements of vision and some of their more important relationships, leaving the interesting problems of their psychophysical correlations, together with the many additional facts which such a study reveals, to the special province of experimental psychology.

CHAPTER V

AUDITION

16. The Conditions of Hearing

HEARING is also a process which involves physical, physiological and psychological facts. As in the case of vision, we must here be satisfied with a brief outline, leaving the more detailed considerations of fact and theory for special courses that bear more directly upon the psycho-physical correlations.

The physical facts involved in hearing are the vibrations of an elastic medium, which is usually the air. The air is made to vibrate by all manner of instruments, and when its vibrations have attained a frequency varying approximately between 16 and 20,000 vibrations per second, these, when communicated to the ear, are productive of sound. Again, as in the case of vision, the physiological capacity of the organ plays its part in the determination of what shall be heard. Not only is the range of its activities limited to certain vibration-frequencies, as above noted, but it also contributes sensations which find no direct correlates in the sound-waves of the air. Furthermore, abnormal conditions of the organ occasion other discrepancies between the sound-waves and the sound-sensations.

17. The Classification of Sounds: (1) Tonal Pitch

Psychologically, we have two great classes of sounds, which we term *tones* and *noises*. An important characteristic of tones, by the aid of which we are able to analyze and define them, is *pitch*. By pitch we refer to the fact that tones may be 'high' or 'low'. This enables us to arrange all possible tones in a series similar to the brightness-series. We may start at one end with the 'lowest' perceptible tone, which corresponds to the frequencies of vibrating bodies approximating 16 per second. From this, if we raise the pitch by increasing the vibration-frequency, we approach the maximum or 'highest' discernible tone, which is attained at approximately 20,000 vibrations per second.

It is needless to say that the use of 'high' and 'low' to describe this pitch-variation is purely figurative. The rather unusual application of these terms bears witness to our disposition to establish analogies, and thus to import into one field terms that really belong to another. In this case, however, it may be assumed that the reader knows what is meant by a tone's pitch. It is a characteristic of all tones, and thus enables us to place them in a serial order.

18. (2) Tonal Character, Fusion and 'Beats'

But the simple progression from low to high does not completely characterize the tonal series. In this progression there exist recurrent similarities

of tone. The most striking of these resemblances is that known in music as the *octave*. Two notes whose vibration-frequency is 1:2 or a power of 2, have very different pitch, but very similar quality. In music they are given the same name, and all systems of music seem to recognize their essential identity. This fact conditions the existence of musical scales. A musical scale is any fixed progression of tones within an octave. The name *octave* is used to describe the eight-note interval which has been fundamental in the development of occidental music. But we have now progressed beyond this, and there are twelve tones in our musical scale, whereas other races, notably those of the Orient, have developed scales on different principles, which contain five, seven and other numbers of tones.

But the essential identity of tones in the 'octave' relationship is not the only significant feature of a progression of tones from low to high. The number of tones that can be distinguished within any given octave is dependent upon the region under investigation within the total progression. Many more tones can be discriminated in the middle region than in the region of low and high tones. Furthermore, the relationships which may be established between successive and simultaneous tones within the octave present a complicated problem, which in its diverse solutions has resulted in the different types of music that man has evolved.

We cannot enter into the details of this problem here, but we may indicate a few of its most striking

features. In the first place, any given tone possesses a certain *character*, which it retains even when its pitch is slightly altered. This character or individuality is not at all determined by the vibration-frequency. It attaches to any tone, and reaches out over a slight range of tones both higher and lower in pitch. Character is determined by the system of tones, or scale, in which the tone in question has its place. Such a musical setting is predetermined in various ways, according to the musical education of the person apprehending the tone. With a minimum of such predetermination from past experience the tone in question would usually be regarded as the keynote of a scale — that is, the first note of an octave. It is, apparently, this fundamental fact which gives individuality to tones. If the tone assumes the character of any other note in the scale, it does so by reference to another note not present but thought of, which is the keynote of that scale.

Hence, we see that the individuality of these tones is not purely sensory, but seems also to depend upon something which is thought into the tone. This appears to be true of all musical relationships, but it is impossible at the present time to determine, apart from the octave relationship, which relations are founded upon original capacities of the ear or brain, and which are acquired.

It is also an open question to what degree the musical relationships in a scale are dependent on pitch, that is, highness and lowness, and how much

they depend upon the musical setting provided by the octave.

It has been recently shown that in a pathological case, the patient retained his sense of pitch, but suffered a certain alteration in his apprehension of musical relationships. For instance, the notes C and G₁ appeared to be in octave relationship. Yet when this interval was compared with the true octave C-C₁, he could detect invariably the greater interval and lower pitch of C₁ as compared with G₁.

This indicates that pitch and character are to some extent independently variable. Pitch-intervals and musical intervals are not identical. We see an evidence of this in the unmusical person who cannot 'carry a tune', but can reproduce the ascending and descending trend of a melody, although he does not always hit the right notes.

It is these resemblances and differences of character within the pitch-series which make music possible. Tones which resemble one another in such a manner that when sounded together they tend to *fuse* and form a more or less unified whole are called *consonant*. Tones which do not possess this capacity to fuse are called *dissonant*. More complicated are some of the relationships existing between dissonant tones. Those which hold between tones of neighboring pitch are perhaps the most striking. When the pitch-difference is very slight, the two tones, successively sounded, may be regarded as possessing the same character. When simultaneously sounded, they often reveal peculiar

sound-phenomena known as *beats*. The two tones appear to fluctuate one with the other. This fact is attributable to a reciprocal interference which is set up between the two waves, thus occasioning periodic reënforcement and diminution of the intensities of sound. The number of beats that can be discerned indicates the exact difference in vibration-rate between the two tones which occasion them. Upon increasing the pitch-difference there develops a certain 'roughness', in which the beats are no longer clearly distinguishable. After a time we arrive at a tone which is clearly distinct as to character, yet a relationship of propinquity may still be discovered in that the two tones seem to go together when successively sounded. This, however, carries us beyond our present problem of tonal analysis.

19. (3) Mellowness, Shrillness and Timbre of Tones

To complete this analysis we must refer to two further facts. First, there is an attribute of tone which correlates directly with the pitch-series. All low tones are *mellow*, and all high tones are *shrill*. This additional feature seems to absorb the tonal character when the sound is very low or very high. In consequence, it is difficult to establish resemblances and relations of a musical sort with very low tones, and quite impossible to do so with very high tones.

The second fact to be noted has reference to

tonal complexes. In our preceding analysis we have assumed pure tones, which correspond to simple pendular-formed vibrations. But such vibrations seldom exist naturally, and the tones we usually hear are not pure, but are mixtures of many sounds: tones and noises. These mixtures are attributable to various physical causes. The chief one for us to consider is the *partial vibration*. It is a physical fact that when a body is set in vibration, it tends to carry out its movements in any and all ways possible. In the case of a relatively simple form of vibratory body, such as a stretched string, this means that in addition to the vibration of the string as a whole between its fixed ends, there also occur part-vibrations, in which the string is divided into halves, thirds, fourths, fifths, etc., these being the partial vibrations that can occur with least hindrance. As a result, we hear, in addition to the fundamental tone, a series of *overtones*, which correspond to these partial vibrations. These overtones form a definite series which may be indicated as $2x$, $3x$, $4x$, $5x$, etc., x being the vibration-rate of the fundamental. The partial tones which extend upwards in pitch to the limit of hearing are all represented in this series. Some may be more intensive than others, owing to the physical nature of the producing instrument, and in some cases the even numbered partials are not present.

It is significant that the relations which are thus expressed between the successive partials, and

between them and the fundamental, embrace all the important intervals of music. Whenever in such a complex sound it is still possible to detect a dominant tone, *i.e.*, a definite pitch and character, we refer to the additional tones and noises which contribute to the sound as the tone's *timbre* or 'clang-color'. Thus it is that we detect differences between tones of a constant pitch and identical character which are produced by different instruments, — a violin and a piano, a horn and a voice. If all these additional elements were excluded, as they can be with the aid of suitable physical devices, we should find the two tones to be the same.

20. (4) Noise

This leads us directly to the analysis of our second class of sounds: the *noises*. Noise is generally regarded as a complicated sound in which it is impossible to detect a simple character or pitch. It is not easy to establish any definite line of demarcation between tones and noises, because most tones have some noise about them, that is, certain complex parts, the character and pitch of which we fail to detect; and, similarly, most noises have something tonal in them, that is, some dominant character or pitch with which musical relationship can be established. Thus there is a certain amount of noise in the notes of a flute, and some tone about the sound that results from rapping on a piece of wood.

There may be, as some contend, an elementary quality of noise. Others think that there is no such simple quality. Noise, they maintain, is a complex, unanalyzed fact of experience. If we could analyze it, we should find it to be constituted entirely of tones. We cannot settle this question at present, but we do know that the character of a noise differs from that of a tone chiefly for the reason that a noise has no place in a musical scale. It is often possible, however, to give it a place in the pitch-series, for noises are mellow or shrill, and may be justly regarded as high or low. It is also a fact that very high and very low sounds are more like noises than tones, even though they are produced by simple pendular-formed vibrations. This is not because we are unable to place them in the pitch-series, but because we cannot place them definitely with reference to an octave. They lack, in other words, the specific musical character which a tone will ordinarily possess.

The physical principles that underly these phenomena, and condition them in a very large degree, are in many respects quite definite, and thus permit us to understand these psychological facts much better than we should if we were forced to rely upon our psychological analysis alone. Thus the physicist shows us that it is possible to analyze all complex waves into simple pendular components. Furthermore, the facts of partial tones and beats, which we have already mentioned, belong more largely to physical than to psycho-

logical analysis. It can be shown that these physical facts correlate directly with psychological analysis, but they have no proper place in our present plan, and must therefore be left untouched.

CHAPTER VI

TASTE, SMELL AND TOUCH

21. Taste

TASTING is a far less important sense than the two which we have been considering, and its psychophysical relations are less clearly understood. We know that the organs of taste are situated in the mouth, mainly upon the upper surface of the tongue, and that they respond to certain liquids when brought into contact with them. But precisely how these little organs, embedded in the mouth's tissues, act, and precisely what chemical affinities they may possess, is a matter for future investigation. Psychologically, however, we are able to classify all tastes in four categories: *sweets*, *sours*, *bitters* and *salts*. The validity of this analysis is shown only when we have taken care to eliminate all sensations other than taste. It is evident that our mouths are not only sensitive to taste, but also to the various forms of cutaneous experience which we have provisionally referred to as *touching*. But, in addition, the nose is in close proximity to the mouth, and what we taste we may also smell. Yet if we eliminate these other elements as far as possible, it seems plain that sweet, sour, bitter and salt are the only clearly distinguishable elements which taste affords us. So far as the mouth is concerned, tea and coffee may be the same; lemonade and a tartaric acid solution are identical.

22. Smell

Smelling, however, presents a more complicated range of facts. There is nothing very striking about the end-organs situated in the upper nasal cavities, and we can say no more about the physical properties of their stimuli than that they are gaseous, or the effluvia which are found in certain gases. Nor are we much better off, psychologically. We know that the odors have a considerable range, and some attempts have been made to classify them, but none has been very successful. One reason for this lack of knowledge concerning smell is the fact that the organs adapt themselves very quickly in the presence of an odor, and we cease to apprehend it. We are, therefore, obliged to dismiss this group of sensations, which apparently plays so large a part in the behavior of some animals, as the dog, and which contributes no mean share to man's appreciation of nature, with a very slight knowledge as to the elements involved.

23. Touch

Touching, the last of the 'common-sense' groups which we have adopted as an outline for our analysis of sensation, is much better understood. It was formerly believed that all bodily tissues were sensitive to touch. More exact investigations have shown this view to be erroneous. Although widely distributed throughout the body, this group of sensations is always correlated with specific end-

organs, as are the other sensations with which we have dealt. Furthermore, we find that it is not one element, but at least four, with which we have to deal, and it is highly probable that each of the different elements has its own specific end-organs, as well as specific types of physical stimuli.

It is customary to classify these sensations, because of their wide distribution, with reference to the situation and use of their end-organs. Thus, we have the *cutaneous* sensations, which are derived from the skin; the *kinæsthetic* sensations, which accompany movements of the body, and are accordingly situated in the muscles, tendons and joints; and, finally, the *organic* sensations, which arise from certain of the internal organs, notably in the region of the lungs and alimentary canal. Of these groups the sensations from the skin are best understood, because they are most readily investigated. We shall, accordingly, begin with them.

1. *Cutaneous Sensations*

Cutaneous experience consists in at least four distinct elements. These are commonly known as *pressure*, or touch; *pain*; *warmth*; and *cold*. Sensibility of these four sorts is distributed pointwise over the skin of the body. The distribution is, however, uneven. Some portions of the skin, as, for instance, the palms of the hands and the finger-tips, are provided with very numerous end-organs, while other surfaces, such as the back and the thighs, find the end-organs much less frequent in

a corresponding area. Furthermore, the pain-spots appear to be most numerous; then, the pressure-spots; next, the cold-spots; and, finally, the warmth-spots. The demonstration of this discrete sensitivity is a simple matter if we apply the appropriate stimuli at different points on the skin. To stimulate pain, the hard outer coating of the skin must be pierced. If we use a fine needle, we find points which respond with a sharp sensation of pain, while others are quite indifferent. Similarly, the pressure exerted by the end of a hair will produce a sensation of touch at certain points, and be unnoticed at others. For cold the stimulus must be somewhat below, and for warmth somewhat above, the temperature of the skin. If the difference be too great, however, a sensation of pain may result which makes the warmth or cold difficult to detect. There appear to be no specific end-organs for pain, but this sensation is mediated by numerous 'free' nerve-endings, which penetrate the skin and extend very near the surface. In order to stimulate them they must be directly attacked by some agency from within or without. It is not definitely known if other nerves than these also mediate pain-sensation. With regard to pressure, it has been shown that the mediating nerves are attached to the roots of the hairs and to certain little cells found in the hairless portions of the skin. Any movement of the skin adjacent to these bodies suffices to arouse a sensation of pressure. With reference to warmth and cold, finally,

no specific end-organs have as yet been differentiated, but the pointwise sensitivity is quite as certain as in the case of the other two sensations.

Cutaneous experience frequently involves mixtures of these elements. Among the most interesting of these are the experiences of *tickling* and *itching*, but it is uncertain whether these are produced by definite combinations of diffuse pressure, warmth and pain, or whether they are due entirely to various modes of stimulating pressure.

2. *Kinæsthetic Sensations*

The kinæsthetic sensations are mediated by small end-organs situated in the muscles, tendons and joints. They provide the characteristic experiences of bodily movement and are always diffuse. It is impossible at the present time to state with certainty whether they involve elements differing essentially from those mentioned, or not. Probably they do not, as pressure and pain seem to be the most striking features of their content.

3. *Organic Sensations*

The same may be said of the organic sensations, although here we have often to deal with complexes, such as nausea, suffocation, hunger and thirst, which have so many adjuncts in their perceptual character that it is well nigh impossible to subject them to very careful analysis. These visceral sensations, as they are termed, play an important part in our emotional experiences. Feel-

ings of elation and depression, bodily well-being, or illness, all depend in large measure upon sensory complexes of this order. It has also been established that the feeling of personality, so far as it is dependent upon sensations derived from the body, is largely attributive to these visceral complexes.

24. Static Sensations

One other group of sensations, the existence of which is, however, debatable, remains for consideration. This group, if it exists, is mediated by organs situated in the labyrinth adjacent to the inner ear and known as the vestibule and semi-circular canals. These organs constitute an apparatus which is apparently designed for the purpose of controlling the equilibrium of the body. Embedded in the bones of the skull on each side of the head are three little canals, placed with reference to one another in the three geometrical planes. They are filled with a watery fluid, and provided with nerves terminating in hair-cells. The hairs extend into the fluid and are affected mechanically by the movements of it which occur when the head moves. By reason of the relative position's of these canals, we have a means of analyzing movements of the head in any direction. It is probable that these stimulations occasion nervous reflexes which set up certain appropriate coördinations of the bodily muscles, thus preventing disequilibrium.

The organs of the vestibule are more primitive, consisting in minute particles of calcareous sub-

stance, known as otoliths, which rest upon hairs. They operate by gravity to stimulate the nerves connected with the hair-cells for a purpose which is apparently similar to that served by the semi-circular canals.

It is maintained by some that the experience of dizziness includes sensations derived from these organs, but it has thus far been impossible to isolate these with certainty. Furthermore, no nervous connections have as yet been established between these organs and the cerebrum. The nerves seem all to terminate in the cerebellum, which is the centre of coördinated activity, but not of consciousness. It may therefore be the case, with man, at least, that no sensation originates in these organs, their service being entirely on the plane of a purely physiological reflex.

CHAPTER VII

THE ATTRIBUTES OF SENSATION

25. General Discussion

IN the preceding sections we have made more than one reference to aspects or phases of sensational contents which we termed attributive. We must now give this matter a more extended consideration. What is meant precisely by the attributes of sensation, and what are they? An attribute of sensation, as commonly defined, is a dependent aspect of the content, which is independently variable. It depends upon the content for its existence, but it may vary in certain ways without altering the essential nature of the content. For example, a tone 'c' may be loud or soft, and yet remain the same tone. A color 'red' may be round or square in area, and yet remain the same red.

All psychologists are agreed that sensory contents are subject to such variations, but there is no unanimity of opinion as to what these variable phases are. One group of theorists contends that all sensations have the same attributes. Another maintains that the different fields of sensation present quite diverse attributive aspects. The theorists of the first group have been largely influenced by systematic considerations. The fact that sensational contents, so essentially different as color and tone, exist simultaneously in the same

consciousness, belonging perhaps to the same object of experience, leads them to seek an explanation in some common properties of these diverse elements. The nature of the attributes which they find is, therefore, in some measure predetermined by the demands of a systematic explanation. On the other hand, those who hold to a strict examination of the various classes of sensation as they are found, or appear, to be, tend to define a distinct group of attributes for each class.

Without committing ourselves to either of these extreme points of view, we shall describe the chief attributes of sensation with reference to the traditional classification of the first type, pointing out the discrepancies of such a classification as they are noted in the different groups of sensation.

This traditional classification maintains four general attributes of sensation: *quality*, *intensity*, *extensity*, and *duration*. According to the theory of this classification, sensation *per se* is but an undifferentiated and indefinite something, when abstracted from its attributes. That which gives it definition is its quality. Qualitative differentiation accounts for the diverse fields of sensation, and also for the kinds of sensation within a single field. It may, therefore, be regarded as the chief among the attributes. In addition to its qualitative identity, a sensation must have a minimal intensity, extensity and duration. All three of these can vary within limits without altering the quality.

26. Quality

Let us test this classification by reference to the various kinds of sensation which our analysis has revealed. From the analytical point of view quality is not an attribute of sensation, because unqualified sensation is purely hypothetical. What our analysis has revealed is elements of sensation which are at once qualities. We might, however, give to quality a somewhat broader significance than we have attached to the element. In the case of vision we have described the elements as six in number: red, yellow, green, blue, black and white. But orange, too, has a quality that is stable. Orange resembles red and yellow, but we cannot pick out its red and yellow parts by abstractive analysis, as we can, for instance, separate the partials in a tonal clang. Thus the number of qualities of sensation would equal the number of homogeneous kinds of experience which can be differentiated from all other kinds of experience. But an analysis of this sort is not very fruitful, since it is practically impossible to establish adequate standards of measurement for such an investigation. Furthermore, when we have secured our definite or approximate results, we must rely upon the elemental differences which we have already found for our description of these numerous qualities. The true nature of orange is still best described by its resemblance to red and yellow, even though the experience be a simple one. It

therefore appears that this broader connotation which may be given to quality does not assist, but rather hinders, analysis.

We have found features of vision and audition, however, that merit some special consideration in this connection. These are *saturation* of visual sensation, *pitch* and *tonal*, or *musical, character* of sounds. Each of these possesses a practical significance in the description of the sensations to which it applies. The question now before us concerns the propriety of regarding them as attributes.

We have found it important to note that a pure color or a pure gray varies not alone with reference to its brightness, but also with reference to the amount of color or grayness which is evident. Yet, as we have seen, this fact is not attributable to either series when considered by itself, but rather to the mixture of elements from the two series. The saturation of a color is maximal when it is freest from all admixture with black and white. Similarly, a black, white or gray is maximal in saturation when no evidence of color can be detected. These variations, therefore, do not add a new aspect or attribute to the visual sensations, more than do the variations that occur between intermediate colors. They arise rather from the peculiarly complicated facts of vision, which require us to differentiate two reciprocally related series of sensations, the colored and the colorless.

With regard to pitch, this is more clearly attributive in its nature. Pitch is universally an attribute of all tones. Our judgment as to highness and lowness is uncertain only when a complex of tones, or a noise, defies analysis. Even in such instances, careful observation will usually detect some constituents the pitches of which are assignable to one or another region of the high-low series. We are justified, therefore, in regarding pitch as a fundamental aspect of all sound-elements unless future research should demonstrate the existence of elemental noise. Whether or not pitch would be universally attributable to noise is less certain.

With the attribute of pitch goes that of mellow-ness or shrillness. We have seen that low tones are universally mellow, and high tones universally shrill. The only question which now arises is that of classification. Some authorities describe these attributes as *spatial*. Low tones, they say, are big, voluminous; while high tones are small, un-extended. Except in the interests of a systematic view which attempts to find a spatial attribute in every sensation, this description is hardly justifiable. The sense of space seems to be derived from those classes of sensation involving the direct appre-hension of two or more simultaneous sensations as possessing different local signs. This is not the case in sound, unless the two ears coöperate in the judgment. A color, for instance, is always extended in some degree, and has a position in the visual

field. But a tone has no such situation in its own right. Its position in space, when it can be determined, is dependent upon extraneous factors, such as relative intensity and timbre for different positions of the head and ears. We shall hold to mellowness and shrillness, therefore, as the more accurate terms for describing low and high tones, without reference to their exact order in the pitch-series.

The problem of character in tones is more complicated. A certain tone has a definite pitch, but it may have several different characters, according to the musical setting in which it occurs. It is this setting which is fundamental. The octave appears to be an original pattern of tonal experience. Whence it is derived we cannot say, but it seems as independent of experience as the sense of space. It must, then, be reckoned as a *perceptual form* of experience. The attribute of character in a tone is, therefore, equivocal, since it not only depends upon, but varies with, the musical setting. Furthermore, its universality is limited, since very high and very low tones do not possess it. A high tone is shrill, and its pitch may be determined, but it often lacks musical relationship. Noise, if it be elemental, evidently lacks this attribute. In the complex sounds which we usually term noises, the absence of musical affinity is their most striking feature. Pitch, as we have seen, is not so difficult to detect, and judgments of mellowness and shrillness are, as a rule, easily made.

There are no peculiarities of a qualitative order which attach to the other classes of sensation,—taste, smell and touch. We may, therefore, dismiss the attribute of quality, as unessential to the description of our sensational elements. But we must retain *pitch* and *mellowness-shrillness* as true attributes of tones. Furthermore, we must recognize the practical significance of *saturation* for visual sensations and of *character* in tones, although these are not, strictly speaking, attributes of the sensory elements in question.

27. Intensity

The next common attribute in the traditional classification is that of intensity. This attribute has universal application in all the fields of sense, although it is subject to some special definition in that of vision. We must be careful, however, to distinguish the attribute-intensity from the intensity of the physical stimulus. Although the two are intimately related, the psychological fact is not a direct awareness of the physical fact, as might be supposed. Physical intensity is a quantity which can be exactly measured. Psychological intensity is not. A unit of measurement can, indeed, be applied to psychological intensity, but its value is not constant in any strict sense. This unit is known as the 'just noticeable difference'. It may be applied to any variation of sensation, but we shall consider it here only with reference to increase or decrease in intensity.

The reciprocal relationships which exist between the intensities of stimuli and their corresponding intensities of sensation are expressed in what has become known as *Weber's Law*. E. H. Weber, a German physiologist who lived in the early part of the nineteenth century, discovered that the discrimination of pressure-intensities was constant if the *ratios* between the weights remained constant. Thus, it was just as difficult to discriminate between 29 and 30 half-ounces, as it was between 29 and 30 drams, *i.e.*, $\frac{1}{16}$ ounces. G. T. Fechner (1801-1887) carried this discovery over into other fields of sensitivity, and expanded Weber's results into a universal law, which may be described as follows: *If a series of sensations, the intensities of which are just noticeable differences, be regarded as constituting a simple arithmetical series, the corresponding stimuli will follow a geometrical series.* The law holds with considerable accuracy for intensities that are not extreme, either minimal or maximal.

It is an interesting and important fact that our sensations do not directly correspond in intensity to the intensities of their stimuli. If this were the case our range of experience would be greatly decreased. As it is, a certain inertia must be overcome before the sensation appears at all, and this inertia increases as the force of the stimulus-intensities increases. As a consequence of this fact we are able to adapt ourselves to both minimal and maximal intensities of stimulation, and to

discriminate with the same accuracy for both, provided the intensities are not too extreme. Hence, it is not the absolute but the relative differences which play the leading part in our discrimination of intensities.

For instance, it might be supposed that a 32-candle-power incandescent lamp would give twice the illumination of a 16-candle-power lamp. But this is not the case. We all know that a single candle in a dark room gives a certain amount of illumination. Two candles give appreciably more light, and with each succeeding candle the illumination increases. But the rate of increase is a constantly diminishing factor, for the addition of a lighted candle to daylight illumination affords no appreciable increment.

These psychophysical measurements have provided a large field for experimental work, but the results have not substantiated Fechner's assumption of a reciprocal relationship between mind and body that permits of universal quantitative expression. In the first place, the just noticeable difference is not a real increment, since it varies in different parts of the intensive scale. Furthermore, it is subject to individual variation. The same individual does not always get the same results, and different individuals get quite different results. Again, the law assumes that when the stimulus is increased by whatever amount, the sensation must be increased, whether we can detect it or not. But this has not been definitely

proved. So far as it holds, the law is now commonly regarded as the expression of a physiological fact, and not as an adequate means for describing the relations of mind and body.

We noted at the beginning of this section that some special definition was necessary in order to make the attribute of intensity applicable to visual sensations. The physical intensity of light correlates with the degree of brightness. Variations from dark to light, therefore, constitute the intensive attribute of the visual elements. But we must note carefully the distinction of brightness-variation from the colored and colorless sensations to which this applies. We have seen that the pure or saturated color exists at a certain medium degree of brightness. Its saturation decreases not only when it is noticeably brightened or darkened, but also when it is mixed with elements of the black-white series. We have also seen that a black, gray or white may retain its elemental character even though it be subjected to considerable variation in brightness, as indicated in our illustration of the 'white' snow and 'gray' sky of winter, when in point of fact the sky is brighter than the snow.

The correlation of brightness-intensity with the colorless series is further complicated by the fact that sensations of gray are produced either centrally or in the retina at times when all physical light-stimuli have been eliminated. If we adapt our eyes to a completely darkened room, we do

not see black in its purest form, but an expanse which is distinctly grayish. Physical intensity of the light-wave is therefore not the only correlate of psychological intensity, since the gray of the dark room is a positive and vivid sensation. But it is a necessary correlate for establishing relative degrees of brightness, and in the main it corresponds closely to the variations of the black-white series.

28. Extensity

Our third general attribute is extensity. Here it is more difficult to establish a universal application. Sensations of vision and touch are extended. No matter how small they may be, they never lose their extensive aspect. But this aspect, as we have seen, does not apply to sounds, neither has it an unequivocal significance for taste and smell.

But extensity in these two senses involves something more than the mere 'spreadoutness' of the element. It has also a locality. This is commonly known as the *local sign* of the sensation.

The doctrine of the local sign, as we shall treat it, consists simply in the attribution of a more or less definite location to the sensations of vision and touch. It has no significance as applied to hearing, unless difference in local signs be attributed to the two ears, and it is apparently of negligible importance in the remaining senses save, possibly, kinæsthesia. For touch and vision, however, which are pecul-

iarly adapted to give us knowledge concerning space, an attributive factor is involved in each sensation which serves as a basis for its location on the skin or in the visual field. The significance of this fact will be made clear when we discuss the perception of space. For the present, we need only say that two elements from one of these fields of sensation, when possessed of different local signatures, suffice to give us the basis for a spatial judgment.

29. Duration

The last general attribute is duration, and it has universal application in all departments of sensation. Our estimates of time are made on the basis of this attribute, but these are all so largely dependent upon perceptual complications that we can say little more of duration as an attribute of sensation than that it exists. Not all the senses are of equal importance as a basis for time estimates: the auditory, the kinæsthetic and the tactual sensations appear as the most important in this regard. This, however, indicates only that these senses are more frequently involved in experiences where time as such is important.

30. Effects of Duration and Repetition, Practice and Fatigue

Before concluding this chapter on the attributes of sensation, we shall devote a section to the considera-

tion of certain important facts directly concerned with the attributive phases of sensation.

The duration of a stimulus has important effects upon the nature and intensity of the sensation. In the first place, there is a certain *latent time*, in which the stimulus must be operative before any consciousness results. The inertia of the nervous process must be overcome before the sensation appears. Gradually, thereafter, it rises to the maximal intensity, which requires another interval of time. After the maximal intensity is achieved, a gradual decrease sets in which is attributable to fatigue. When the stimulus ceases, this decrease becomes more rapid, but the sensation continues for an appreciable length of time before disappearing.

In the case of brief but intensive stimuli, we find, instead of the simple rise and fall of the sensation, a tendency to oscillation,—appearance and disappearance, with gradually decreasing intensity. We have noted the continuance of sensation after the cessation of the stimulus in the visual after-images. The succession of positive and negative images, or the ‘flight of colors’, is an instance of the oscillation here described. These facts indicate that when the inertia of the nerve is once overcome, the process which is set up continues for some time after the stimulus has ceased. This is evident in the after-images which we have noted, but there are also grounds for supposing that it continues even after the sensation has ceased.

We shall return to this fact in our consideration of the perseverative tendencies in memory.

When the stimulus is repeated frequently, the latent time is lessened, and the maximal intensity is sooner attained. The onset of fatigue is also in some degree checked. These are some of the chief effects of practice. But practice does not eliminate fatigue, and it is not advantageous to continue successive repetitions after fatigue is evident. The effects of practice are, however, a permanent acquisition, despite fatigue. It has been often noted that the performance of a practised task is more effective at the beginning of a new period, after an intervening rest, than it was at the close of the last practice-period.

The inertia of the nervous process is also responsible for another effect. When successive stimuli are sufficiently rapid so that the latent times of the sensations overlap, there results a fusion of the sensations into a continuous experience. If sectors of black and white are rapidly rotated, the two sensations mix to form a uniformly gray disk. If a point of light is whirled about in the dark, we see a circle of light. It is this fact that makes the cinematograph possible, in which the variations in the successive pictures are apprehended as *movements*. Our sense of movement is therefore derivable from a succession of discrete stimuli, when they follow one another with sufficient rapidity to prevent the occurrence of latent time between the successive sensations. A certain

speed is requisite, otherwise we have the experience of 'flicker', in which the fusion is incomplete.

These general facts are applicable in all the departments of sense, and they form a foundation for the study of the learning-process, adjustment to environment, and habituation.

CHAPTER VIII

IMAGE, AFFECTION AND THOUGHT

31. Mental Image

i. *Image and Sensation*

TO the division of conscious facts which are termed sensations, we must now add another: *mental images*. So far as we have yet been able to learn, these are in no essential way different from the sensations. The psychophysical distinction of the two is based primarily on the fact that the images are not dependent on the stimulation of a sensory end-organ. Their service, therefore, does not consist in affording us presentations from the outer world, and from our own bodies, but rather in enabling us to revive facts from past experience. It is thus apparent that we must study the images in connection with their physiological correlates, and also with reference to mental activities involved in the revival of past experiences.

For our immediate purpose of surveying consciousness with the aim of discovering the elements of which it consists, we may confine ourselves to a brief discussion of the nature of the mental image in the various sensory categories we have distinguished.

The visual images stand forth, in certain ways, as the most important among the imaginal ele-

ments. We cannot say that they are universal constituents of mental life, for they are, of course, entirely absent in the case of the congenitally blind, and they do not appear to be of frequent occurrence in every individual of normal eyesight. The importance we claim for them rests, rather, on the fact that they indubitably exist, apart from any visual sensations which chance also to be present. While glancing at an object, it is possible to have, at the same time, a visual image which is clearly distinct from the visual sensations that are present and, so far as one can tell, quite independent of them.

There is great variation in the character of visual images among different persons, and at different times for the same person. These variations are referable to the attributes of the image, which are the same as those for the corresponding sensations. It is usual to declare that these attributes of the image have a narrower range than when applied to the sensation. It is, in general, true that we cannot establish the same range of saturation or brightness in visual imagery that we can in visual sensation. The local sign and duration of the image are also less exactly known than in the case of sensation. Yet this is largely because of the difficulties attaching to all investigations without objective control. At times visual images evidence degrees of saturation and brightness which render them *hallucinatory* to such an extent that it is impossible to distinguish them from sensations.

It is also possible for them to possess a very exact local signature and a persistence in time which render them by these means undistinguishable from the sensations. Even among individuals who very seldom are conscious of a visual image, there appear, occasionally, images possessed of a remarkable vividness. It has often been noted that an occasion peculiarly conducive to these vivid images is afforded in the moments which immediately precede sleep.

Auditory images are often very vivid and indicate marked variability in all their attributes. In the case of taste, however, imagery is usually very slight and uncertain. Some individuals can imagine tastes with considerable vividness, yet an uncertainty still remains from the fact that accessory sensations and images are usually involved to a considerable degree. In imagining the taste of beefsteak, for instance, one is prone to visualize the meat, and to move the jaws in the act of chewing. To make the illusion more complete, the flow of saliva is slightly stimulated, and the appropriate tactal sensations are suggested and even sensed or imagined. The simple taste of the steak, which is principally a combination of salt and sweet, is found on analysis to be more difficult of detection.

With smell, there is more reason for assuming independent images, though here again the experiences are for most people rare, and may be partly or wholly derived from the interpretation of certain

olfactory sensations that are actually present. Thus, one can seem to detect in the odor of fresh tobacco smoke, or incense, various distinct fragrances which may be summoned forth at will.

With the class of bodily sensations the existence of independent images is also problematic. They seem to exist, at least for cutaneous pressure and its kinæsthetic counterparts, but upon closer examination, sensations of a relevant sort are almost invariably set up. Consequently, the independent existence of these images is hard to secure.

We conclude, therefore, that although theoretically we may assume the possible existence of images corresponding to each class of sensations, we are quite certain of independent images,—that is, such as have no necessary sensational concomitant,—only in the case of vision and audition. They doubtless exist, however, in the case of smells, probably also in tastes and the general group of bodily experiences.

2. *Imaginal Types*

Much attention has been given to the classification of individuals in accordance with their imaginal type. The elements most conspicuously involved in such classifications are the visual, the auditory and the kinæsthetic, since these are the classes of image which might be expected to appear most often in connection with all manner of centrally aroused processes, both rational and fanciful.

Individuals have been divided accordingly into classes which seemed to indicate a predominance of visual, auditory or kinæsthetic imagery, and also into classes of a mixed type, such as visual-auditory, visual-kinæsthetic and auditory-kinæsthetic.

The importance of such classifications has been based largely upon the assumption that all centrally aroused processes are carried on in imaginal terms. Upon this assumption it was clearly a matter of great pedagogical value to determine the type of imagery which an individual used most readily in order that the educational appeal might be made as direct and economical as possible, and also that undeveloped capacities of imagery might be trained to more efficient service. But since this assumption has not proved to be well founded, images being frequently only adjuncts of minor importance in the centrally aroused processes, the value of such classifications is less assured. Furthermore, the difficulties of classification are very great, since there appears to be no direct correlation between the sensory appeal and the capacity for imagery. Some individuals find visual sensations much more attractive, and more readily apprehended, than auditory or kinæsthetic sensations, and yet they may be markedly deficient in visual imagery. The same disparity between sensations and images of a certain type can be found in the other fields of sensation.

The type distinctions constitute, therefore, a

complex problem, which can be worked out effectively only with reference to the perceptual and other synthetic aspects of mind.

3. Produced and Reproduced Images

We have noted the dependence of images upon previous sensational experience, and the fact that they reveal no absolute qualitative difference from the sensations. The distinction is a practical one, made ordinarily with reference to the strength or weakness of the attributes which the elements possess. We are also greatly aided by extraneous facts: the nature of the total situation, the problems and directive tendencies that are operative, etc. Thus we are usually able to distinguish the evanescent and representative nature of the image from the more substantial and insistent character of the sensation.

If sensation and image are not clearly separable as contents, neither is the distinction of produced and reproduced imagery one in which a qualitative differentiation is possible. The difference between fancy and memory is synthetic, not analytic, in its nature. Imagination is an ideational process, and will be considered under that head. As contents all images of fantasy are of one sort, which we may term revived sensations. But the wealth of experience which accrues to any man is sufficient to provide him with imaginal elements for the greatest variety of unique and fanciful combinations. Therefore, while it is not possible to

transcend the limits of our sensory experience in the creation of imaginative complexes, it is quite possible to transcend the facts of perceptual experience. This will furnish us with a topic for later discussion in its appropriate place.

4. *Summary*

In summary we may say that the images form a class of elements closely related to the sensations. The fact that they may be experienced simultaneously with sensations of the same class and yet without adequate sensory stimuli, enables us to make the distinction and refer them to a separate group of elements.

32. *Affection*

The third division of mental facts revealed by our analysis consists in the elements of affection. Not only do we experience sensations and images as such, but we are also *affected* pleasantly or unpleasantly by them. This introduces a group of experiences which on first consideration might seem to belong more properly to the attributive aspects we have considered. But although it is probably true that affection never exists apart from mental elements of another sort, yet it cannot be adequately reckoned as an attribute of sensational and imaginal elements. This is clear when we consider that a certain sensation may affect us now pleasantly, and again unpleasantly. The appearance of the affection is evidently not conditioned

by the character of the sensation, but is contingent rather upon mental happenings of a considerable diversity and complexity. Some psychologists, accordingly, hold affections to be integrative resultants of sensational and imaginal complexes, and regard them either as elements of a secondary or 'higher' order, or as being entirely derivative in nature. The evidence at hand does not suffice to make either of these theories quite satisfactory, and we shall therefore reckon the affections among the elements of consciousness.

The exact nature of the affectional elements is not clearly understood, and what we can say concerning it is, therefore, tentative. The undisputed facts are that some experiences are set in a glow which seems to enrich their content, while others evince the opposite effect of depletion. Variations in the degree of enrichment or depletion are readily observed, while many experiences are free of any noticeable affective tone.

By common consent, the most apparent types of affective tone are described as *pleasantness* and *unpleasantness*. Experiences which are enriched are usually described as pleasant, agreeable or joyful, while those which are depleted are referred to as unpleasant, disagreeable and painful.

It should be noted that this use of the term 'pain' is distinct from that which we have applied to a class of bodily sensations. Bodily pain is usually disagreeable, though not universally or necessarily so, since the stimulation of pain-spots

on the skin may be an interesting or even a pleasant experience. Furthermore, it is evident that many experiences, which are in a high degree unpleasant, involve no sensational pain whatever, as in the case of disappointment or sorrow.

It may not appear that the opposition, pleasure—displeasure, is adequate to cover all affectional experiences. Indeed, it is plainly inadequate when we consider the manifold complications of our affective life. In the case of the æsthetic appreciation of a tragedy, for instance, an affective tone that is essentially unpleasant may be sublimated by an artistic treatment which brings to the whole experience a glow of enrichment. Experiences, too, which involve *interest* seem to vary from an indifference-point in one direction only, since interest has no opposite as a positive affectional experience. But these are not simple feelings. They involve complicated units of experience such as our elemental analysis cannot adequately account for. We must, therefore, reserve any debate upon this issue until we are ready to consider the synthetic aspects of affection. At this point we shall be content to abide by the generally accepted doctrine of the elemental character of pleasantness and unpleasantness.

It appears, then, that all simple affections arise from an indifference- or zero-point, from which they vary in the two opposite directions of pleasure and displeasure. Their attributes are those of intensity and duration.

We have noted that the distinction of sensation and image was psychophysical rather than psychological, inasmuch as no certain psychological criteria have as yet been found for distinguishing the two. The psychophysical criterion refers to the presence or absence of adequate sensory stimuli, and the resultant experience is either original or revived. Affections appear to be always original. They attach themselves to, and are contingent upon, the present content, whatever it may be. Here again we have an indication of their dependent nature. In order to understand them more fully and exactly, we must await, on the one hand, further introspective evidence concerning them, and, on the other hand, more exact knowledge of their psychophysical bearings.

33. Thought

Thoughts constitute the fourth and last group of conscious elements. Sensations, images and affections are not the sole contents which mental activity brings together in the complicated fabric of experience. These contents also *mean* something, and it is in the analysis of meaning that we come upon the thought-content.

The discovery of this element is recent, and it is less well defined than the others. Objections have been raised to its acceptance, and its claims are not yet fully established. Numerous investigations, however, have revealed experiences which are not reducible in the ordinary way to the three

classes of elements already considered. Many who have subjected the meaning-process to an unbiassed analysis, both experimentally and theoretically, have reached the conclusion that additional contents, other than those mentioned, are here involved. We shall take our position with these investigators, and attempt to justify the recognition of a new element as an essential constituent of the experience of meaning.

In doing this we are fully aware of the provisional character of such an attempt. A new conception so radical as this wins its way slowly in any science. Since the science of psychology has been able to establish its analytic methods with three classes of elements, it is only natural that the addition of a fourth group should be subjected to careful testing and criticism. Yet only in recent years has the attempt been made to understand the nature of thinking. As a subject of experimentation, the field is a new one. We are not justified, therefore, in refusing to accept the results of this research simply on the grounds that such results have not previously been obtained.

The status of sensation and image is assured, because these facts have been obvious from the beginning. But the existence of affective states is also commonly accepted, although the exact investigation of their elements is quite as much a problem of the future as is the case with thinking. In neither instance are we able as yet to give a complete description of the elemental contents in-

volved. Yet to maintain that elements are present which are irreducible to sensation and image appears to be as well founded in thinking as it is in affection.

The thought-elements may be classified under two heads: 1. *Notions*, and 2. *Relations*.

1. *Notions*

By notion we understand a content of experience that sums up in a nuclear form a series of experiences which, *in extenso*, would involve sensations, images and affections. In acquiring an understanding of a geometrical proposition, — as, for example, that the sum of the interior angles of a triangle is equal to two right angles, — one makes use of words and diagrams; *i.e.*, of sensational and imaginal contents. But once the proposition is understood, it is no longer necessary to repeat this extended proof in order to know its truth. The awareness of meaning may come directly in a simple pulsation of thought which embodies the essence of the detailed processes from which it was derived. It is this *essence* of a situation, or complex mental happening, that we call a *notion*. It may be vague or definite, abstract or concrete. Sometimes it is a mere indication that a satisfactory result could be obtained. Such *intentions*, as they have been called, may consist merely in a consciousness of the direction which a problem has set, — as, for instance, one may have in mind only a sense of familiarity with the geometrical

problem, plus a lead of some sort toward its solution. Again, the notion is a definite *what*. The gist of the meaning is known quite apart from any tendencies directed toward more extended experience. In this case we may know that the three angles when reduced to a common base will unite to form a straight line, without the consciousness of any imaginal elements. A concrete notion of this sort enables one to have in mind a simultaneous knowledge of the six surfaces of a cube, something which could not be imagined singly.

Notions exist along with sensations, images and affections, and thus add the increments of meaning which these contents have acquired. But they also exist separately in isolation, without the attendance of relevant contents of another order. It is the discovery, under experimental conditions, of this fact which has led principally to the differentiation of the thought-contents as distinct elements, although many theoretical psychologists had seen the necessity for this distinction even before such experiments had been made.

It has been a principle of psychology for many years that the fundamental type of conscious element is the sensation. Thinking has accordingly been regarded as consisting chiefly in revived sensations, or images. Without attempting to determine whether or not sensations are the most fundamental type of element, we are unable to regard their 'copies', the images, as the sole, or even the most important, contents of thought. We shall

therefore add the thought-content or notion to the classes of elements which our analysis has indicated, and regard it as a distinct element of consciousness.

2. *Relations*

But thinking involves another factor beside the notion. This is the *relation*. Relations are not contents which exist independently in consciousness. Yet one content may be related to another in either simultaneous or successive experience, and such relationship involves a unique fact not accounted for by the simple existence of the two contents in question.

To distinguish the consciousness of relation from the consciousness of content, we may say that relations *subsist*, while contents *exist*. This means that a relation always involves at least two foundations between which it obtains. These foundations may be of very various nature. Sensations, images, affections and notions all permit the establishment of relations. But in addition, relations may subsist between attributes. Size, intensity and duration are foundations for relationship, as well as qualities of color, pictorial fantasies and feelings of joy or disgust.

The classification of relations is not yet fully agreed upon, but for the sake of illustration we may mention the following five groups as exemplifying the facts dealt with: (1) There are relations of *particularity* based upon some peculiarity of a relational member. Thus an element or attribute

may be set off from the attendant experience by some characteristic of uniqueness. (2) There are relations of *equality*, as when two magnitudes of a sensory nature are regarded as being the same. (3) *Similarity* is a frequent type of relation, as in the comparison of forms. (4) *Difference* involves a multitude of relational types. These vary from the simple consciousness of distinction to the more precise relations of dependency, such as part to whole, subordinate to superordinate, etc. (5) *Identity*, finally, is distinguished from equality, in that we deal here with qualitative rather than with quantitative likeness. The identity of red is established even when the objects so colored are of very different kinds and magnitudes. Various combinations of these distinctions are likewise possible. Partial identity may also involve the peculiarity of one member, while equality usually involves some element of difference. But it may be said that more than one relationship is here established.

Relations frequently subsist in cases where only one of the terms is definite. One may be conscious of *horse* in a subordinate relationship of difference before one is conscious of *animal* as the superior term sought. In this case the second term is merely indicated as a notion of intention,—a consciousness of the direction in which the second term is to be sought. It is also possible to recall a relationship once established without either term being given in consciousness. The contrast of extremes,

for example, is a common subject of thought. Yet in order to think it, the concrete factors in which the relationship originally subsisted need not be present. Perhaps the typical experience for this relationship is the contrast of black and white, or that of a tall and a short person. Yet, although their images or their verbal counterparts come readily to mind when one seeks a concrete foundation for the relationship in question, they are not essential to the thought of contrasting extremes, and can be very well dispensed with. In such a case as this, however, the relationship is not actually *subsistent* in consciousness, but really *existent* as a thought-content. It is not the relation itself, but a notion of the relationship, which is experienced.

Thus we see that the notion is the true content of the thought-consciousness, when we mean by content a separable entity. But notions are derived not alone from contents, but also from their attributes and relations. Relations, like attributes, can occur in their own right only when their foundations are present. The foundation for an attribute is always a separable content of experience, — a sensation, image, affection or notion, — while for the subsistence of a relation at least two foundations are necessary, though these may be attributes as well as contents of experience.

34. Summary

This concludes our analysis of consciousness. We have found it possible to enumerate and describe four groups or categories:—sensations, images, affections and thoughts. The sensations are conditioned by external physical stimuli and a corresponding neural process, both of which may be defined with some exactness. Sensation, therefore, affords us direct information concerning the world in which we live, including, of course, our own bodies. The psychophysics of the image is not so well understood, but the probable condition is that of an inadequate stimulation of the same neural tracts or of the same pattern of neural stresses and strains that, when originally excited from without the central system, produced a sensation. The image is therefore sometimes referred to as a ‘centrally aroused sensation’. In its characteristics or texture, it does not appear to be different from a sensation. We may therefore consider it as a *revived* sensation. Our knowledge of the conditions which occasion the appearance of an affection are even more obscure. It is possible to give a hypothetical explanation for affection, in terms of the interplay of nervous energies in a manner to procure an increase or decrease in the intensity of the current, but such theories are at present entirely conjectural, and some authorities go so far as to deny that affection has any nervous correlate. The absence of detailed information concerning the nervous

process also precludes the possibility of explaining, as yet, the psychophysical nature of thought. Hence, we must content ourselves with the fact of its existence, until our knowledge of neurology is more highly developed.

1. *The Problem of Analysis*

Before concluding this section, it is well to recall what we have previously said regarding the possibility of a more ultimate analysis of consciousness than the one we have outlined. The close resemblance of images to sensations has revealed the possibility of reducing the former to the latter category. Similarly, in the case of affection and thought, future investigations may point the way to a consideration of these facts as *integrations* of more simple and more truly elemental contents of mind. Perhaps we shall find that the sensory process is a sufficient basis for all these integrations. But for the present, it appears best to describe the facts as we have done, and to await a time when our knowledge is more complete before we attempt to push our analysis farther back.

There is one point of systematic importance, however, which in view of some of our later considerations, it may be well for us to enlarge upon here. In the interests of a systematic derivation of all experience, we are led to inquire if all experience may be attributed directly or indirectly to contact with the outer world. If it can be, then

some fundamental element akin to sensation would seem to be its natural source. If, however, we are led to the conclusion that factors not derived from contact with the outer world, but existing prior to all external experience, constitute the coöperating agency of mind, to form and direct mental happenings, then we shall not find in sensation the sole basis of experience. This second alternative would tend to seek in the mind itself the origin of thoughts and possibly of affections, leaving the sensations and images to be accounted for by contact with the physical universe.

Part III

THE SYNTHETIC FACTS
OF MIND

CHAPTER IX

ATTENTION

35. Introduction

WE must now undertake the problem of putting together our elemental facts. It is evident that mental happenings are imperfectly explained by a mere enumeration of such elements as we are able to isolate. Isolation, itself, renders a mental content abstract and unreal. It is not aggregations of sensations, images, affections and thoughts which we experience, but things and ideas, emotions and judgments, all existing in a complicated temporal order. To make our synthesis possible, and regain our concrete mental happenings from the elements which we have analyzed, it is necessary that we should now investigate a group of facts pertaining to mental activity and physiological process.

36. The Characteristic Fact of Attention

The first of these synthetic facts to be considered is that of *attention*. There is nothing that differentiates mental and physical happenings in a more striking manner than the fact of attention. Physical forces operate together under the law of the resultant, which is illustrated most simply by the parallelogram of forces. In a word, the resultant is merely the aggregate of the various forces

applied at a given point. The mental happenings of any moment are likewise a resultant of many forces, but the dominant fact is not always the one which a simple study of the physical conditions enables us to predict. The mental processes operate here with a determining tendency best described as *purposive*, whether or not we shall in the future be able to reduce it to a physical basis.

Other things being equal, of two sensory stimuli the more intensive will be the more effectual. But the 'other things' are not often equal, and consequently, the moderate light-waves reflected from a printed page may engross us, despite the roaring of a tempest in our ears.

This is the characteristic fact of attention: the *vividness* or *clearness* attaching to a certain event in experience among a multitude of other events which are all clamoring more or less for recognition. Some degree of clearness is always attributable to an experience, whatever its nature, but the problem of establishing the relative degrees of clearness attaching to the various elements of a complex is not an easy one. In the first place, experience is never simple, for, as already pointed out, its elements are not concrete events which can at once be distinguished in the aggregate whole. Full attention is possible only at the final stage of presentation, that is, after the event has been established in consciousness. It is then a unit of experience, but at the same time subject to

analysis. Thus, a narrower view may reveal a shifting clearness among the details of the event. In a general way, it is usually possible to distinguish one thing as *focal* and therefore relatively clear, as compared with numerous other things which are non-focal and unclear.

An analogous condition prevails in the field of vision, where it is determined largely by conditions of retinal sensitivity; but the concreteness of the case makes this a rather satisfactory illustration. A certain central area in each retina is more highly sensitive than the surrounding areas. This causes us to focus the eyes in such a manner that *direct* vision is secured for objects falling within these areas. Such objects are distinct, as compared with those projected upon the outlying portions of the retinæ, which are indistinct.

The conditions which determine attention, however, are not in the first instance sensory, as regards the case of vision just noted. We are not necessarily attentive to objects that fall within the range of direct vision, though such objects naturally call our attention. We can also attend to objects in indirect vision, as when, for purposes of psychological analysis, we desire to study the nature of the indirect visual field. In the case of moving objects, furthermore, an impression in the indirect field is more effective than one in the direct field, causing us to turn our eyes involuntarily to bring the object in question into focus.

37. The Mental Act of Attention

The direction of attention in a purely sensory manner may be occasioned in three different ways: (1) By the sudden increase or decrease in intensity of a sensation already present in consciousness; (2) By the sudden cessation of a sensation which has been present but unattended to — as, for instance, when a monotonous sound, like the ticking of a clock, is suddenly withdrawn; (3) By the sudden appearance of something new, which by reason of its intensity, extensity, endurance, movement or qualitative peculiarity is forced into the focus of experience.

Cases such as the above are known as *involuntary* attention. Yet these are but the relatively infrequent distractions which interrupt our normal mental processes. As we have already noted in Part I, consciousness varies through the stages of the *simple presentation* and *awareness* of an object to its complete *establishment* as a unified fact of experience. The first stage is one of inattention, since no single fact is more prominent than another. In the second stage, some degree of clearness attaches to the object of which we are aware. It is singled out from among the others that are present. At the final stage it is clearly attended to as a definite unit, although this unit is not a simple but a complex fact of experience. A selective purpose is now operative in directing the attention upon facts which may, in themselves, possess none

of the striking characteristics of uniqueness or intensity which we found to be the occasion of sensory attention. It is this selective purpose that makes possible the absorption of thought in matters the sensory contents of which are of the most uniformly monotonous character. Thus, we may read, or write, or think, for hours at a stretch, with little or no distraction from attendant sensations. But preparation for attention does not necessarily involve a conscious expectancy. The selective purpose also operates unconsciously. We are often prepared to give full attention to objects that are not anticipated. The consciousness of the situation or problem before us need not be explicit as to the occurrence which it is directing.

This state of *readiness* conditions an enhanced sensitivity, causing a relevant sensation to appear more intense than it otherwise would. This is most clearly evident in the case of tones. But the question whether such enhancement is due to a real intensive increase, or only to a greater degree of clearness, is still a matter of dispute. In any event, the fact is referable to the act of attention and not to a mere variation in the attributes of sensation. Attributive variation may be the basis for discrimination, but the *act* of discriminating must take place before such a discrimination can be made.

The consciousness attaching to this act of the attention is usually described as *interest*. We are interested when we attend. The mental ac-

tivity which makes attention possible is fundamental to this experience. But interest is not merely a conscious act of mind. It has also an affective side, which is usually pleasant. We shall refer again to this phase of interest in our chapter on the emotional experiences.

38. The Fluctuations of Attention

One thing further must be emphasized: — the attention is never at a standstill. The things to which we attend, and which have the peculiar clearness due to purposive control, are constantly shifting. Be it sensation, image or thought to which we attend, it must constantly change, or be submerged. Attention to simple sensory and imaginal constructs is accordingly very brief. When these constructs are more complex, the attention may have opportunity to wander over the various component parts. But it is in the process of thinking that the attention has its widest scope, and may therefore adhere the longest to a unified construct.

An explanation of the fluctuations of attention is partly to be sought in the nature of the attentive act itself. It is an essential characteristic of this activity that new material is constantly being presented. When the material becomes uniform and monotonous, interest flags. This is but an indication that the activity involved in clear presentation is ceasing. But there are also physical causes which contribute to such fluctuations. The fatigue of

the sense-organ is the most conspicuous among these. Not only is it impossible to maintain the act of attention when the sensory material remains the same, but the sensations show marked alterations in quality and intensity when they are continued without interruption or variation. Hence, fluctuations in attention are a combined result of a variation in the nature of the mental activity and a variation in the nature of the sensation or other content to which attention is being given.

39. Summary

To review briefly what has been said, it appears that consciousness may vary from a state in which an aggregate of events is simply presented, to one in which these events are highly organized about a central focus. It is in this last state that attention is manifest in the highest degree. It may be conditioned in either of two ways, or by the joint operation of both. The one set of conditions is purely physical, while the other is, so far as our knowledge now extends, mental. In either case, the conscious result is an attributive clearness which attaches to the fact or facts occupying the focus of the experience, and the state of mind is the one described as interest. We have indicated the physical conditions for this organization of experiences as due to intensity or difference in the conscious events attended to. We have referred more vaguely to the mental conditions as those involved in conscious purpose. Except that we

may recall our introductory remarks concerning the problems and directive tendencies which are operative in all conscious adjustments, it will not be advisable for us to pursue the discussion and explanation of these mental acts until we have before us further data concerning mental syntheses.

CHAPTER X

MEMORY

40. Revived Sensory Experience

THE next fact in synthesizing our mental elements which calls for consideration is that of *memory*. We have already touched upon this in our description of the mental image. The image is essentially a revived sensation, and therefore presupposes memory for its existence. A theory of memory may be constructed in which this alone is taken into consideration. But such a theory fails to explain the appearance of thought-elements and the conscious directions evidenced in our mental happenings. It may be well, however, to consider this theory first, because so far as it goes it is quite satisfactory, and we shall then need only to extend it in order to understand the wider-reaching consequences involved in reasoning.

Confining ourselves, then, for the time to sensory experience, we find that every sense-impression leaves us predisposed to the revival of that experience. We note this in two ways: first, in the recurrence or *reproduction* of the experience as an image; and, second, in the which may attach to the sense-impression when it is renewed. Both these facts are doubtless based upon, though perhaps not fully explained by, physical conditions in the organism. The assumption seems to be

warranted that every sense-impression modifies the nervous structures in some manner, although we are at present unable to explain how. These modifications are the occasion for two tendencies of revival. The first is known as the *reproductive tendency*, and indicates the readiness of the impression to be aroused again when a suitable motive is afforded. The second is known as the *perseverative tendency*, and indicates a certain vivacity which the impression possesses in its own right, thus enabling it to endure for a time, usually rather brief, and to revive itself occasionally without the assistance of a conscious motive for reproduction.

1. *The Reproductive Tendency*

The reproductive tendency has a basis which is possessed of a high degree of permanence. This accounts for the common opinion that nothing is ever entirely forgotten. This statement is not fully justified by the facts in the case. Experiments show that all impressions fade with time, if they are not repeated. During the first few hours they sometimes lose ground with great rapidity, but after a day, they no longer continue to fade at the same rate, and as time goes on the increase in loss of capacity for reproduction is reduced to a minimum. Thus, some trace of the original impression may be detected in the speed of re-learning long after it has become impossible to reproduce the image or to recognize a renewal of the sense-impression.

2. *The Perseverative Tendency*

The perseverative tendency appears to rest upon the fact that the organic basis of memory is not merely a *plasticity* of the nervous structures which enables them to retain lasting impressions, but also an *elasticity* — if we may use this term in a purely analogical manner. That is to say, the organic process continues to be active for some time after the impression has ceased, and may manifest itself by a recurrence of the image from time to time, when the attention is not closely directed upon other matters. This, as we have noted in § 30, is based upon the *inertia* of nervous processes. A familiar illustration is found in the popular melodies which take possession of us, and run in our heads for days whenever an odd moment of inattention occurs. As they are repeated these airs constantly acquire new vigor and vivacity for their next appearance.

41. **The Conditions of the Memory-Tendencies**

There are three principal conditions which govern these memory-tendencies: (1) Intensity, (2) Recency, and (3) Frequency.

1. *Intensity*

The intensity of the impression is due to various causes. We have, first, the intensity of the stimulus which plays its part in producing a lasting and vivacious impression. But the attention also plays

its rôle, as we have seen, independent of the intensity of the stimulus. Consequently, we have, second, the degree of clearness which attaches to the sense-impression, as a condition of effective memory. Third, it appears that affection (pleasantness and unpleasantness), when aroused with a sense-impression, is favorable to its endurance and vivacity.

2. *Recency*

It is sufficiently evident from what has already been said regarding the basis of the reproductive and perseverative tendencies that, other things being equal, a recent impression will possess more active tendencies for revival than an impression of an earlier date.

3. *Frequency*

It is also clear that the more frequently an impression is repeated, the stronger these tendencies will become.

The three conditions enumerated interplay freely in determining a particular revival. Thus, intensity may prove in a specific instance to be more powerful than recency or frequency, and again, recency or frequency may dominate the remaining two conditions. One special instance is worthy of note. It appears that of two impressions of different age, other conditions being equal, the older tendency is sometimes more effective than the newer one. We find an exaggerated illustration of this in old age forgetfulness, where recent impressions fail

to acquire their normal force, and the individual dwells, as we say, in the past.

One further fact is to be noted regarding the basis for reproductive and perseverative tendencies: namely, that a certain period of time appears requisite for any sense-impression to become *set* before the tendencies mentioned can appear. This means that if a certain impression is interrupted in its course or immediately superseded by another impression which dominates consciousness, the tag-ends, at least, of the preceding impression fail to take hold, and no tendencies of revival are established by them. This is known as *retroactive amnesia*, and is manifest when one turns the attention abruptly from one matter to another, dissimilar, matter. The organization of the first matter seems to be interfered with in such cases, and as a result parts may be lost irretrievably. The same thing is noted when an impression is interrupted by a shock of some sort which throws the mind into a state of confusion or unconsciousness.

From this we can draw the practical conclusion that it is unwise, when attempting to impress the mind with different subjects which are unrelated, to turn the attention abruptly from one to the other. The impressions will be more effective if a brief pause of from three to five minutes is allowed between the impressions of unrelated subjects. We also learn from this fact the reason for the forgetfulness attaching to the moments which immediately precede an accident, often making it impossible for the

person concerned to 'know what struck him', and also frequently rendering the testimony of witnesses to such an event unreliable.

42. Association

Let us turn now to the problem of motivation in memory. The facts which hinge most closely upon the revival of discrete sensory impressions are those commonly described as *associations*. Association refers simply to the means by which a previously established reproductive tendency is made effective without a complete reinstatement of the original impression. This appears to be occasioned in two ways: Either some portion of the original impression recurs and is effective in motivating the reproductive tendencies of other portions of the original experience which were contiguous to it in space or time, or some similar or analogous impression is effective in a like manner.

1. *Contiguity*

Regarding the first form of association, which is described as association by *contiguity*, we have no sufficient facts at our command for carrying through an explanation in terms of the physiological basis of memory. It is probable, however, that the basis of memory in these cases is a functional pattern of some sort, produced by the stresses and strains of the original impression in the nervous system, and when a portion of the pattern is set again in opera-

tion, the whole, or, at least, the dominant remaining portions of the process, tend to be reproduced as a result of the previous organized impression.

2. *Similarity*

With reference to association by *similarity*, or analogy, it is more probable that we transcend the limitation of a simple and automatic procedure. Instead of identical part-correspondence as a means for actuating reproductive tendencies, we are confronted by a situation in which an analogical relationship is established between a present and a past experience never before connected. We have described the relation as an element of thought, which is not immediately derivable from sensory experience, but is a result rather of the productive or creative activity of the mind. Such analogies at times are established between contents which are totally different in their sensory characteristics, as, for instance, in the classical illustration of Newton's analogy between the heavenly bodies falling through space, and the falling of the apple to the ground. On the other hand, simple relations of similarity are established between complex sensory impressions by means of a common component. Thus, a gown of a certain scarlet color might recall a flower of the same color. Such cases are not essentially different from those of contiguity where the association is based upon an identical link.

This fact has led some psychologists to argue that association by similarity is but a case of association by contiguity. They contend that some partial identity is always demonstrable whenever an association is effected. The whole question reduces itself to one of fact:—namely, are our experiences completely accounted for in terms of sensory association of partial identity? We have already answered this question negatively in Part I, by insisting that the collocation of mental events was not purely a mechanical aggregation, but one which manifests the direction of an active subject exercising a monarchical supervision over his experience. If we accept this view, it becomes necessary to subordinate the reproductive and perseverative tendencies to the more powerful activity of the directive tendencies.

This leads us to the conclusion that neither partial nor complete identity of present impression with past experience is a full explanation for revival. We may even question whether any such identity exists in an absolute sense. The logic of identity which permits us to bring organization into the chaos of sensory experience is a logic of *meaning* rather than one of sensory content. We have no guarantee that any sensory content is ever repeated exactly; on the contrary, we have much evidence for believing that change is the more fundamental law of events. Let us therefore consider the case as follows:—Every sensory impression leaves a perseverative tendency, by means

of which the experience may be revived more or less as it was originally experienced without associative connection. It also leaves a reproductive tendency which is actuated by some conscious motive for revival. This motive may appear as a sensation-, image-, or thought-content which is partially identical with or analogous to the original experience. Furthermore, it is under the monarchical supervision of the problem before us, and the directions which the problem gives.

It is only in certain instances of disorganized consciousness, as in the state of drowsiness or distraction, and their abnormal counterparts among the insane who suffer from the 'flight of ideas', that we find the mechanical operations of sheer association dominant. These are known as 'free' associations, since they are not subject to the supervision and control of a definite task.

3. *The 'Free Association' Method*

A method has been devised for the experimental investigation of these simple and more or less mechanical operations of association, which is known as the 'free association' method. This consists in presenting to the observer a series of simple words, orally or visually, with the general instruction that each word be paired with the first word which comes to mind after it is presented. The reaction-word which the observer supplies is immediately uttered, or its presence is indicated by some direct means, and the reaction-time is

carefully noted by the experimenter. It is found that normal reactions of this type usually consume less than one second in time, and in a long series the variation is not great. But certain exceptions will appear in which the reaction is noticeably delayed.

The study of such a series of paired words, correlated with their respective reaction-times, and also, if possible, with the observer's introspective account as to what happened in each case, has proven a very valuable source of information regarding associative connections. In the reactions of normal length, the reproductive tendency is seen to operate in the majority of cases to bring to consciousness words which have been contiguous with, or which are similar to, the stimulus-words. Occasionally, there appears a word in which such an associative connection cannot be traced. These are usually the result of a perseverative tendency which, as we have seen, provides for the recurrence in consciousness of experiences that have possessed a peculiar liveliness in their impression. They are therefore reproduced without the presence of an adequate associative motive.

In the case of the delayed reactions, we find that the mechanically direct operation of reproductive and perseverative tendencies is hindered by the injection of a directive tendency, or by a conscious conflict of tendencies. Anything that arouses our interest will tend to interfere with the mechanical course of association. For this reason, the

method has a practical significance and may be used for the purpose of analyzing complexes which the observer, consciously or unconsciously, keeps back. For instance, it has been used with considerable success in the detection of crime. Into a list of words which may be expected to occasion only indifferent and mechanical associative responses, there is introduced a number of words possessing an intimate significance for the one who committed the crime. These words must, of course, be selected with great care, so that they will arouse interest in the perpetrator of the deed, and will be of indifference to all others. If this can be done, the reactions for these words will be delayed in the case of the criminal, but not in the case of an innocent person.

The method is also used in analyzing the mental happenings of individuals who suffer from aberrations traceable to certain emotional 'complexes', which dominate their lives and make their behavior irrational. The delayed reactions often indicate the presence of these emotional complexes, and the significance which can be attributed to the word and its associate will sometimes reveal the nature of the complex, and suggest a means of overcoming its baneful influence. We shall return to this matter when we discuss the topic of Insanity.

Thus we find in the partial identities and habitual relationships of the 'free' associations, indications of the mechanism of revival in its purest and most

unrestrained form. But whenever the attentive mind is operating with problems and directions of a purposive character, the associative mechanism is subordinated to a lower rank, where it affords, in accordance with its abilities, the data for selection and rejection upon which the purposive mind operates. To be sure, the sheer strength of an associative bond often brings to consciousness images, relations and even thoughts that are quite irrelevant to the proceedings at hand. But, if the problem and directive tendencies have sufficient strength, these are suppressed and dismissed. When this is not the case, we have an instance of distraction, and the mind may then take up the new content as a basis for further determinations and for sequential expression.

4. *Conclusion*

Thus we see that our associative memory, as important as it is in furnishing us with the relevant material for mental operations, is not a complete account of all that is stored in our minds and subject to revival. In addition, we must consider those mental products called thoughts:—namely, the relations and notions which are the results of organized experience having as their basis not merely the sensory content, but also the aim of the subject in effecting these organizations. The results are notions, which contain the nuclear essence of many experiences; and relations, which subsist between the contents,—sensory,

imaginal and notional,—to effect that unity and coherence characteristic of mental happenings. These thought-elements, while they may be associated among themselves and with the sensations and images, are subject to directive guidance in a manner in which the sensations and images are not. We seem, therefore, to find two levels of reproductive activity in our minds: A lower level, which is essentially that of association by contiguity; and a higher level, in which a directive tendency occasions, primarily, the appearance of notions and relations relevant to the problem at hand, and, secondarily, the reappearance of images associatively connected with the situation.

43. The Process of Remembering

The process of remembering involves three distinct phases: The first is the *presentation* of the material to be memorized. This may be merely noted, or it may be repeated and learned. Second, the material is retained through modifications of the nervous structures involved, either because of their *plasticity*, which conditions a lasting impression, or by virtue of their *elasticity*, which makes possible a continuance of the nervous process after consciousness has ceased. These after-effects are subject to the individual variations which we note in the ordinary distinction between 'good' and 'bad' memories. The third phase is that of *re-presentation*, and it, in turn, involves three forms of reappearance.

The first of these is the simple *reproduction* of sensations in imaginal form. (We have already noted that the affections are not reproduced, but are always *actual*, that is, original, experiences.) The second form dispenses with the image, and produces a notion of the original content. Thus, we *think about* what we have experienced and in notional form revive sensations, images and affections or their attributes and relations. Although I cannot revive a pleasure that is past, I can very well think about it, in which case I am conscious of its essence or meaning. The third form of re-presentation is a complete *re-living* of the former experience. In this case, the images are reproduced, with their meanings and affections, in a more or less adequate revival of the whole situation.

All three of these forms of re-presentation may be experienced with or without the consciousness of relationship to the past. When this relationship is established, we speak of *recollection*. Retention is the basis for all re-presentations, whether recollected or not, but it continues to exist even when no conscious evidence of it is present.

Recollection also involves *recognition*, and we shall devote a special section to the consideration of this experience.

44. Recognition

1. *Dependence on Problem and Direction*

It is usual to say that a memory or revived experience is known as such by reason of the fact that

we recognize it. Since it is not true that all revived experiences are recognized, nor even that all recognized experiences are those which have been revived, recognition cannot be described as an invariable attribute of reproduced elements. The reason for this is to be sought in the nature of the distinction between the produced and reproduced contents of experience. The essential difference between these does not appear to lie in any definite peculiarity of a content of fantasy, as compared with a content of memory. Just as we have found no grounds for setting off sensations as intrinsically different from images, so we find that fantasies are not, as such, clearly distinguishable from memories. In both cases, it is largely the problem before us with its directive tendencies upon which the practical distinction rests. This does not mean, of course, that it is an arbitrary matter whether a certain conscious occurrence be recognized or not, but it does mean that we are *set* for memories or fancies in advance, and that the selection of the revived images, notions and relations is made in accordance with this direction. Thus, it may happen that one directed toward memory-contents fails to detect the appearance of something which is in reality new and never before experienced; or, that one directed toward fantasy fails to recognize old and oft-repeated happenings. But although recognition is responsive not merely to the nature of a content as revived or new, but also in large measure to the

attitude which the problem at hand and its directive tendencies occasion, it is not without practical significance in its evaluation of the situation as a whole. As such it is, indeed, highly trustworthy, and in its very failures to detect with accuracy phases of an experience as new or old, it only reminds us that mental happenings are always complex, and that their primal significance always attaches to the whole process and not to the parts, whatever their origin may be.

From one point of view, all conscious facts as elements are old. That is, with reference to sensational experience the individual runs the gamut of his sensational capacities in infancy, and all that he can experience thereafter is but a renewal of these facts. From another point of view, however, experience is always new; new relations and new notions are constantly being formed; the selective agency of mind never permits us to live again with exactness any moment which has passed. Hence, it is not with reference solely to the elements of our experience that we determine their identity and difference, but more largely with respect to their meaning for us in any concrete instance.

2. Recognition as Affection and Thought

Recognition, as applied to the total situation, expresses this meaning, and we must now consider what it is in itself. It has been customary to regard it essentially as a feeling of 'at-homeness' which attaches to the old, as compared to an oppo-

site feeling of surprise and strangeness which attaches to the new. These affective tones are then analyzed into pleasantness and unpleasantness, respectively. Without raising immediately the question as to why an old experience should be invariably pleasant and a new one invariably unpleasant, we may first question the facts of the case. Evidently, they do not justify this conclusion in the mature mind of man, though there may be some grounds for the assumption that a genetic truth is here involved. It is well known that animals, in the main, appear to favor the customary and avoid the strange in their adjustments. But this, of course, does not prove that feelings of pleasantness and unpleasantness attach to the two sorts of situation. We are therefore thrown back upon human experience for our interpretation. This does not justify us in assuming that even in its most primitive stages any such invariable correlation of pleasantness and unpleasantness with the old and the new is to be found. On the contrary, the new has far greater possibilities of affectional enrichment than has the old. Were it not for this, we should be at a loss to explain the spirit of adventure, which appears even in animal life to provoke those modifications in adjustment without which no evolution would be possible.

Not only does pleasantness often attach to the new, but unpleasantness frequently attends the old in experience. It is the frequent repetitions,

the monotonous sameness of things, which provoke *ennui* and distaste for life. Consequently, it appears that if we are to regard recognition as essentially an affection, we must demand some 'higher' order of affection than that afforded by the opposition of pleasantness and unpleasantness. But if we can account for recognition in another way, we shall have no need for introducing such an 'order' of affection. It seems probable that we can do this, although as yet the psychology of recognition has not been subjected to sufficient experimental investigation to render our remarks on the subject more than tentative. The theory we suggest is that a *notion* rather than a *feeling* of familiarity furnishes the basis for the judgment of recognition. Such a notion will appear whenever a situation presents thoughts, images and affections the origin of which it seems possible to trace in past experience. In other words, the situation *means* something familiar. The notion expresses this fact, and involves a corresponding intention toward this end. But such an intention is no certain guarantee that the end is achievable. In the main, however, experience will validate such notions, and we therefore learn to accept them without testing them on the spot. This is one of the economies practised by the thought-process. We simply leave it to future happenings to justify our snap-judgments in the matter. Thus, the 'feeling of familiarity' is but the pleasure symptomatic of an assurance which appears when

the tendencies of revival are under way, and seem to encounter no obstacles. But it is not the first thing to appear, nor an invariable consequent, because recognition often occurs without it.

CHAPTER XI

PERCEPTION

45. The Nature of Perception

WE are now prepared to consider a third synthetic fact of mind, namely, *perception*. By perception we mean the process by which the sensory elements of experience are organized into units, or things. When one looks out upon a landscape, it is not mere blotches of shade and color in areas of different shape and size that meet the gaze, but houses and trees, fields and hills, clouds and sky,—in a word, objects to which a definite significance attaches.

I. *The Analysis of a Percept*

It is evident that the *percept*, i.e., any object which has a sensory basis and means something, is no simple aggregate of sensations. On the contrary, it is both more and less than the sum of the possible sensations of the moment: more, in that very important additions are supplied from the individual mind in which the sensations occur; and less, in that the selective ability of the mind grasps and assimilates only a portion of what is offered by the sensory stimuli.

A percept is a complex group of elements in which the sensational constituents are augmented by all manner of centrally aroused elements. Just what these are is a matter for special analysis in

each particular instance. But the most striking fact is that over and above its sensory and imaginal constituents, the experience possesses a *form-quality* and unit-character which is *notional*.

2. *Hallucinations*

We cannot even affirm that sensation constitutes the invariable nucleus of the percept, though this is undoubtedly the type of experience with which we are dealing. In cases where no adequate sensory basis is to be found, we have what is known as an *hallucination*. Such experiences are clearly abnormal, and it is contended by some that they indicate an unusual distortion of sensory experience. It may, indeed, be true that no experience can be without sensory constituents, and that in a case where an observer attributes an objective reference to voices or shapes which are not discernible to others, he is really misinterpreting very grossly sensations that are actually present. In such an event, hallucinations may be regarded as highly exaggerated *illusions*, these being instances in which a sensory content appears to be other than in reality it is.

An instance of this sort came under the writer's observation, and may be mentioned to illustrate the point at issue. A patient suffering from a serious illness, which interfered with his power of speech, complained through his written communications that animated figures hovered about the

head-board of his bed. In order that the light from the windows should not disturb him, he was lying, at the time, with his head at the foot of the bed. As the difficulties of writing were considerable, he was asked to sketch the shapes that he saw. He did so, the result being a fairly accurate copy of a geometrical design composed entirely of straight lines, which was outlined in gold in a central panel of polished ebony on the head-board of the bed. This indicates, in this case at least, that the sensory content of his percept was quite normal, yet the hallucination was definitely attached to it, and therefore was not a mere projection of a centrally aroused image.

The point which this instance makes emphatic is that centrally aroused adjuncts are of great importance in the percept, and also that they are not simply or, perhaps, even typically of the nature of images. It is usual to maintain that a percept consists mainly of selected sensations from the total situation, supplemented by such images as are called forth by association. We have found reason to doubt the importance of associated imagery as being the only essential fact of memory, and in the case of perception we may be equally sceptical as to the validity of the above description. As to content, the notions and relations of thought undoubtedly play a more important part in the formation of the perceptual unit, than does the mere accretion of images projected into and fused with the sensory content. While it is not neces-

sary to deny that such projection and fusion do take place, it is to the thought-elements that we must look for the *meaning* which is essential to this synthesis.

3. *The Percept as Meaning*

The percept, then, is not an aggregate of mental elements, for mere aggregates occur, if at all, only on the basis of simple associative fusions, whereas in the percept it is the meaning or interpretation that is important. Hence, a percept must fit into the purposive directions of the course of mental events and be subject to them. Thus, relevant thoughts arise in response to the combined effects of sensory content and directive tendency. The sensory content influences the purpose, and the purpose determines the selection of sensations, together with the associated and directed supplementation of thoughts and images.

Since the significance of perception for our mental life consists in making us understand the world which surrounds us, it is evident that the rôle of sensation is typically the most important one in the complex. It is the starting-point for our interpretation, and if we perceive correctly, we must depend largely upon the sensory data which are offered. When we fail in this, we are subject to illusions, hallucinations and all the fallacies that inevitably arise from malobservation.

4. *Illusions*

We have already discussed the nature of hallucinations. The *illusions* constitute a distinct chapter of experimental psychology, which falls, however, without our range. Yet we may say, in passing, that an illusion is a percept in which the sensory content appears to be different from what it is in reality. Although we may know exactly what the facts are, the illusion often persists. This indicates that deep-seated habits and congenital tendencies are involved in our perceptual experience in a manner which often resists the purely sensational effects of the stimulus. In the geometrical-optical illusions, straight lines may appear longer or shorter, curved or changed in direction, when accompanied by certain arrangements of other lines, and it is impossible to overcome this illusory effect except by elimination of the accompanying lines of influence. Such an elimination can be partially effected after practice by attentive concentration, but this is not an easy matter, since the normal operations of the attention do not lead to the elimination of parts in an experience, but merely to their subordination in an organized whole.

46. Perceptual Forms

1. *The Universality of Space*

In discussing the sensations, we have referred to their attributes as independently variable ad-

juncts appearing in the different classes of sense. Among these attributes there are two which have such wide-reaching significance, that they may be correctly regarded as perceptual forms. These are the attributes of extent and duration, which become, in their perceptual setting, *space* and *time*. The importance of these two *forms* in which experience is cast, is self-evident. All experience involves a spatial world, even though we may not attribute extensity to every sort of sensational element. It has been argued that a conscious being, bereft of vision and the sensitivities of skin, muscle, tendon and joint, would have little notion of space. Others, recognizing the inconceivability of such a consciousness, have argued with equal vigor that all sensations, whatever their kind, must possess the attribute of extension. It seems hardly necessary for us to attempt a settlement of this dispute. Since tactal sensitivity is evidently the most fundamental type of perceptual experience, it is enough that this be granted in order that we may establish the universality of space as a form of perception.

2. *The Universality of Time*

As for time, no such question arises, since all sensations possess this attribute. Yet even here marked differences are noted in the capacities of different senses to make themselves emphatic through their temporal attributes. Time is judged

much more readily by hearing and muscular sensation, than it is by vision, taste or smell. The universality of time, however, is uncontested. We may, therefore, class it with space as an invariable form of perception.

3. Intensity as a Universal Form

The third general attribute of sensation is intensity. But this apparently does not contribute to a perceptual form of the same rank with those of space and time, for the reason that it is much more strictly a sensational factor. It appears perceptually rather as a discrete happening than as a general and formative mode of experience. We have noted its close affiliation with attention. Its service is more largely that of aiding the selective activities of mind, than of forming elements into perceptual groups. But although it does not possess the same significance that attaches to space and time as agents of perception, we must not underestimate its importance as a contributory factor. Towards intensive experience the attention is directed, and it is precisely the selective activity of the attention which is responsible for the existence of the percept. But as a universal form in which all sensory experience is cast we may relegate it to a lower rank than that accorded to space and time.

Let us now consider these two forms in greater detail, in order that we may better understand the nature of perception.

47. The Perception of Space

The most ultimate characteristic of space is revealed in the fact of the 'spreadoutness' of things. This all-pervasive fact is an unanalyzable datum of perceptual experience. It is perhaps not inconceivable that one may transcend space in a state of highly absorbed contemplation, or in the mystical ecstasy of a seemingly direct communication with God, but it is at least beyond our comprehension to approach the concrete world of everyday life without regarding it as placed in a more or less definite order. The scene extends about us with its objects placed discretely, above, below, to right and left, near and far, while in the midst rests our body, sensing its own parts and its environment.

It is a very complicated situation which confronts us, but in order to analyze it somewhat, let us confine ourselves at first to the facts contributed by vision. Here it will be well to distinguish between two-dimensional and three-dimensional space. The mere 'spreadoutness' of things, which we found it necessary to postulate as a perceptual form, gives us our foundation for visual space-perception. The local signs of the visual field bring order into an otherwise homogeneous expanse by enabling the discrimination of different points with reference to one another and, more especially, to the centre of clearest vision.

It is not with two-dimensional space that our serious problem arises, but with the three-dimensional perception of distance away from the observer. Here our acquired and not our innate capacities play the leading rôle in rendering our visual space not flat, but solid. Without the bodily mechanism, and the coöperative uses which we are able to make of it, it is improbable that we should be able to 'see' depth. We note with interest the development of these capacities in the child. That he cries for the moon, and reaches out to grasp it, indicates how inexact is his judgment and how different must be his world of space from the well-ordered expanse of the normal adult. The chief factors that contribute to this acquired depth-capacity are of two sorts: (1) There are certain purely pictorial signs which experience teaches us to regard as significant of distance; and (2) there are certain motor mechanisms, mainly of the eye, which are involved in the course of visualizing near-by objects.

i. *Pictorial Signs*

The pictorial signs that assist in judgments of distance are, of course, numerous. They are also, in some measure, individual. Any visual characteristic tending to recur with objects which our general experience demonstrates to be at a certain distance, is interpreted to signify that distance. We therefore base our judgments on our experience, and they are contingent on our opportunities

and needs, and also on the visual peculiarities of our habitual environment. We may enumerate five of these pictorial signs which are very frequent in their occurrence, and therefore of especial importance.

(a) *Geometrical Perspective*. This depends upon the optical principle that the area of the retina which is stimulated by an object of constant size varies inversely with the square of the distance of the object from the eye. Under ordinary circumstances, we do not interpret this fact to mean that the object in question has grown smaller as it recedes from us, but that it has become more distant. It is evident that we must have some knowledge as to the actual size of the object in order that this judgment may be of value. But even a strange object seldom appears in an environment in which there are not other neighboring objects already known to us. Accordingly, we can and do make our judgments with reference to the objects which we know.

(b) *Aerial Perspective*. This depends upon atmospheric effects. Since in gazing at distant objects we must penetrate a heavier veil of atmospheric particles, it happens that the distance is always shrouded more or less in a haze, which obliterates the local colorings and makes dim the outlines of objects.

(c) *Shadows*. All solid objects illuminated from a single source of light cast shadows, and these give us indications as to their corporeal nature.

When the illumination is diffused and equally distributed from all directions, we are at a loss to make these judgments. This accounts for the unreality of some stage-pictures, and also for our failure to take note of spatial discrepancies which would otherwise prove disturbing. The farther removed such stage-pictures are from the actual effects and conditions of normal scenes, the more readily we can accept them as visions of an ideal and imaginative realm.

(d) *Superposition*. An infallible sign of distance is produced when one object cuts across another. At once we know that the partly hidden object is behind the other.

(e) *Movement*. This is but an application of the first mentioned sign, that of apparent size, to a moving object. It is evident that a moving object will appear to rush across the field of vision if it is near us, whereas with the same actual speed it will seem to creep along, if it is sufficiently distant. Similarly, we can produce apparent movement in a static object by actual movement of the head.

By means of these signs, distance and solidity are 'seen', that is, they enable a fairly accurate interpretation of three-dimensional space-relations. That their importance is really very great is apparent from the satisfactoriness of spatial representations on the flat surface of the painter's canvas, for it is largely by means of pictorial signs, such as the first four of these, that the painter is able to awaken a sense of space in his spectators.

2. *Stereoscopic Vision*

But there are other components involved in the visual perception of space which the painter cannot use, and which are so compelling in their force that they are known as the true stereoscopic indices. These are visual in a secondary sense, since they depend upon optical mechanisms and adjustments. They may be described under three main heads, as dependent upon (a) *accommodation*, (b) *convergence*, and (c) *retinal disparity*.

(a) As for *accommodation*, we mean by this the automatic adjustment of the lens of the eye, in order that a clear image may be focussed upon the retina. We are not conscious of producing the necessary muscular changes, except in case of strain when the object is very near or very far from the eye. It is found, nevertheless, that judgments of relative distance can be made with a single eye. Some authorities have supposed this to be an evidence that the muscular adjustments which have occurred are registered in our consciousness, even though we do not attend to them as discrete facts. But recent research tends to discredit this view. The indications now are that we judge depth only on the basis of visual changes which accompany more or less sudden alterations in accommodation.

(b) *Convergence* involves the two eyes, and results from the automatic tendency to bring the fixated object to the central and most clearly seeing areas of the two retinæ. The muscles

of the eye-balls work in harmony to produce this result, thus determining an angle of convergence formed by two imaginary straight lines extending from the point fixated to the centres of clearest vision of the two retinæ. This angle increases in size, with a corresponding increase in convergence, when the object approaches the eyes; and decreases when the object recedes until, at a certain distance, the axes, or lines of regard, are practically parallel. Here again, except in the case of strain, which is noticeable when the convergence is great, we are unable to attend to these muscular sensations. It appears that convergence has its effect in the same manner as accommodation through the accompanying alterations in vision.

(c) The fact of *retinal disparity* is more complicated, yet it is but the outcome of optical principles of projection as applied to the two retinal surfaces. A simple experiment will elucidate the fact. If we hold our two forefingers vertically before us, the one directly behind the other, and fixate the nearer, the one behind will appear to be doubled, one finger appearing to the right and the other to the left of the fixated finger. If we fixate the farther of the two, the near one is doubled in a similar manner. It appears from this that we can see singly and distinctly with two eyes only such points as are at a constant distance from us. All points at other distances, either nearer or farther, are doubled. This fact is expressed by the doctrine of corresponding retinal points. For every point on

one retina there is a corresponding point on the other retina. When the two are simultaneously stimulated, they are seen as one. Whenever a single object stimulates points on the two retinæ which are non-corresponding, or disparate, the object appears to be more or less vague in outline, or doubled.

Now, since these doublings or displacements of objects depend upon their distances with reference to a fixated point, and since their displacements are determined with reference both to amount and to direction by rigid optical principles, it follows that we have here an additional set of pictorial signs for our binocular vision which we can and do interpret in terms of distance, rather than accept them for what they really are. If our muscular convergence did not act automatically, and our eyes were more rigid in their adjustments, we should more frequently experience the confused doublings which our experiment revealed. But since experience teaches that these doublings are deceptive, and since we have great facility in altering our convergence and fixation-points, we fail to notice these discrepancies except to interpret them as indications of distance.

It is the application of this principle that makes possible the illusion of distance and solidity provided by the apparatus known as the *stereoscope*. Two photographic views taken from slightly different positions are presented through the stereoscope, each to its proper eye. The result is a

fused visual effect, affording us some of the points for judging distance which we obtain from nature. The effect is not complete, as some have maintained, because the varying accommodations of the lenses, and convergences of muscular adjustment are not called into play. This accounts for the fact that there is always a certain unreality in these views, a sense that the space which we apprehend through the stereoscope is illusory.

These three components of visual space-perception are all dependent for their effectiveness upon the actual nearness of at least one of the objects upon which the judgment of distance is based. For remote objects, without reference to a near point, differences in accommodation and convergence are negligible quantities, and no discrepancies are detected between points of the two retinæ stimulated by the same object. It follows that the purely pictorial characteristics are the only ones upon which our judgment of distance and solidity can rely when the scene is sufficiently remote, and it is for this reason that landscape painting has been described as ‘the representation of things seen at a distance’. We may go even farther, and say that since the painter has only the purely pictorial signs with which to create a sense of space on his flat surface, he must, in order to give verisimilitude to his work, treat all his subjects, whether they are to appear near at hand or remote, in accordance with the natural conditions of things seen at a distance. When he does this the result

is convincing, for it is a part of his art to place his picture in an ideal space, having no immediate point of contact with the actual space of the spectator's environment. Since the principles he applies are natural principles, we are able to understand his spatial effects, and shall detect no discrepancies in them.

3. Tactual and Kinæsthetic Elements

We have discussed the visual perception of space at some length, in order that we might have a concrete example of the manner in which sense-impressions are fused and interpreted as perceptual units. We have made frequent reference to 'experience' as the court of appeal which makes valid the interpretations given to these sensory complexes. The grounds for such 'experience' are various, and it would carry us too far from our programme to attempt to trace them to any considerable extent. But we may say, in general, that the principal foundation of all our spatial experience is afforded us by our tactual and kinæsthetic sensations. The fact that simultaneous tactual sensations are not presented to us as undifferentiated fusions, but are discriminable as to their situation and order, was indicated by the attribute of local sign which we found to attend both visual and tactual sensations. The addition of kinæsthesia is of vast importance in bringing together by a sensory bond tactual and visual sensations which are separate in time. It is through

experiences of this sort that we are able to know distances, by having walked them, or by having exerted the muscles of our arms, as in throwing, to cover the ground in question. All knowledge of this sort is acquired very gradually, and it varies greatly in different persons. At first there is but the vague 'spreadoutness' of things, with some attributive local significance. Much testing and trying is necessary before the well-ordered spatial universe of the average adult mind can be achieved. Even with reference to the order of objects in a two-dimensional space, the genesis is a slow process, as may be noted from the fact that a two-year old child can 'see' a picture as well when it is reversed as when it is right-side up.

It is, then, to our tactal sensations and the attendant movements of our body that we must refer in testing out our spatial experience, and they are the guarantors of the validity attaching in later life to the visual signs detected in objects with which we are not in immediate contact.

48. The Perception of Time

Time as a perceptual form may be treated more briefly than space, since it appears to rest more directly upon the sensory attribute of duration. What we note most especially in the temporal aspect of things is the marked tendency towards groupings, which vary in a complicated manner, in accordance with three distinct kinds of motivation. First, the sensory stimuli may be discrete or con-

tinuous, and if continuous, periodic or non-periodic. Second, the physiological processes of our bodies are in part discrete and non-periodic, but more largely continuous or at least periodic. Thus an attack of indigestion produces discrete effects which are only contingent upon the specific causes operative at the time, but the general process of digestion is repeated at intervals, with a fair degree of regularity. Third, our mental processes are not entirely dependent upon the temporal characteristics of the physical stimuli or physiological processes. Attention favors now the discrete and non-periodic, and again the continuous and periodic. The temporal form of preception is, then, subject to these three variable occasions, and the perceptual units which result are the combined effects of these three causes.

1. *Intervals*

Attention affords us two different temporal forms of perception, which we may describe as *intervals* and *durations*. The first are brief *intervals*, i.e., periods under four seconds. This period marks the upper limit of our capacity to apprehend an event as a unitary pulsation. Beyond this length of time there occurs a disaggregation, and the interval falls into a varying number of units. We notice this fact in the so-called 'fluctuations of attention'. These fluctuations, as we have seen, are not entirely a matter of our inability to hold a fact before us in mind for a longer period

than four seconds. Physiological fatigue of the organs stimulated is largely responsible for this more or less periodic ebb and flow in mental happenings. Under certain circumstances, the subdivision of intervals which exceed our capacity to hold them as units is more or less regular. It then appears as *rhythm*.

It is a matter of debate whether our sense of rhythm is innate, or is entirely an acquisition of experience. We need not enter into this controversy here. In either case there can be no doubt that it is universal. Although its development in different individuals shows great variations, there are, nevertheless, marked tendencies towards rhythmic groupings manifest in all mental happenings. The simplest and most natural of these appears to be the grouping by twos and threes. These in combinations give us the basis for the familiar rhythms of musical setting. It is, however, incorrect to suppose that all rhythms are based upon groupings of twos, threes and their multiples. Rhythms of five and seven may also be acquired, and we find them in frequent use among semi-civilized peoples who have brought the rhythmic aspect of their music to high development. But it would appear that the groupings of five and seven are less frequent than those of two and three only because the sense of rhythm develops with serial muscular responses which are repeated, and the nature of our more frequently repeated activities favors the smaller divisions rather than the

larger. Our incapacity to hold any one fact for a period longer than four seconds causes the conscious sequence to break up into parts. For the sake of simplicity these divisions tend to be regular. This, together with the character of the stimuli and their conformity to physiological conditions, determines the number accorded to a group.

2. *Durations*

The second form of temporal perception afforded by the attention has no immediate connection with the continuities which characterize certain physiological processes, and it is not, properly speaking, rhythmic. This provides us with our sense of *duration*, rather than of interval, and is referable to the activity of a directive tendency. All those mental happenings which stand under the monarchical supervision of a single conscious direction tend to be grouped into one duration. These units are usually of appreciable length and are non-periodic. The length is a variable quantity. It is not measured by the fluctuations of attention, either pure or of the derived fatigue-order, but solely by the number of interesting events which happen during the period. Under the influence of a strong and steady directive tendency, such durations may persist for hours, days, or even longer. Distractions and interruptions have no part in the process. When we return to our task, we pick up the threads where we left off, and go on with our problem under the same supervising guidance which

was present at the start. It happens, then, that various directions are operative in our daily lives, issuing from the different problems before us. These succeed one another as the situation may suggest and justify their appearance.

Some of these directions operate with a periodic regularity which has its root in physiological conditions. Thus, the diurnal course of night and day, with its corresponding physiological conditions of fatigue and rest, determines sleep and awakening. Periodically changing conditions in the alimentary tract determine the regular recurrence of hunger at meal-times. In addition to such directions as these, the diverse problems of our daily life prompt activities the duration of which is subject to the grouping of larger units with their subordinate parts. These durations vary in accordance with the nature of the problem: whether, for instance, it be a continuous or a discrete activity that is prompted.

When we speak of a sustained piece of work, we mean an activity entirely supervised by a single motive. It may require months for its completion. During that time the actual work may be subject to numerous subordinate directions. Furthermore, it will be interrupted by all manner of irrelevant tasks which have no other bearing on the work than that they interfere with the smooth course it would probably take, if such interruptions were avoided.

So far as concerns the actual time-judgments we are able to make of these durations, they

are naturally very inaccurate. Since we judge in terms of particular events, and the subordinate problems that occur, we are confronted with a paradoxical result. A duration filled with an interesting succession of happenings, all of which are closely supervised by one general directive tendency, appears to run off with great rapidity. If we recall it, however, the many recurring thoughts and associated images make it appear longer than it really was. An interesting illustration of this paradox is afforded by our memory of dream-states. It may be objectively determined that a certain dream consumes in actual time but the few seconds elapsing between its sensory stimulus and the awakening. Yet the number of apparently discrete events which are later recalled makes it appear as a thing of hours.

The opposite to this paradox is recorded in the familiar fact that time drags when experienced events are uninteresting. When waiting for a train, for instance, with no other conscious purpose than that of starting on our journey, we keep our attention on the time, and so it seems interminable. Yet when we recall the experience later, we are at a loss to understand why it should have seemed so long, since we can revive so few of its details.

3. *Summary*

To summarize what has been said, there appear to be two temporal forms of perception: brief intervals and longer durations. The brevity of the

first group is conditioned by the fluctuations of attention, which are in part, at least, the result of a physiological insufficiency, or fatigue. The sense of rhythm, its origin and development, is closely correlated with this fact. The second group, comprising the longer durations, is, on the contrary, subject to the directive tendencies which issue from the problems confronting us, the unification of our mental happenings being dependent upon the persistence of these directions in spite of interruptions.

CHAPTER XII

IDEATION

49. General Considerations

A FOURTH synthetic fact, which now calls for investigation, is that commonly known as *ideation*. By ideation we mean a process of synthesis in the realm of the productive and reproductive activities of mind, which corresponds to perception in the realm of the immediately given. Whereas the perceptive process accounts for the percept with its sensory foundation, the ideational process issues in the *idea*, a unit the structural constituents of which are chiefly thoughts and images. The problems with their directive tendencies are responsible for the formation of ideas. Being relatively independent of the sensory facts of experience, ideas transcend, in some measure, the forms of space and time found to be essential in the production of the percept.

It is this process which is responsible for our ability to reason, to imagine creatively, and to revive our past experiences in accordance with our needs. We have already explained the nature of reproduced imagery, and we have posited the existence of imageless elements of thought: — notions and relations. We have not yet attempted to show the derivation of the latter. Images are unquestionably derived from sensations. Are thoughts also derived from this source? We cannot answer

this question categorically at the present time, but the peculiar dependency of thoughts upon directive acts indicates that they are not simple derivations, as are the images. We have seen that association accounts for a mechanical sort of revival in which purposive guidance plays no conspicuous part. This does not account, however, for the production of notions and relations. We have described the notion as the essence of a mental happening which, when originally experienced, may have involved many and diverse elements. A relation is our apprehension of connections subsisting between mental contents and attributes. Now, the essence of a situation stripped of its sensory components could, of course, never be obtained if the complete sensory situation had not been present. But the principle of mechanical association does not suffice to explain the result. The wider-reaching and freer activities of purposive direction are the necessary postulates for this. That notions are imageless is also an evidence that they are of a different elemental kind from sensation.

With reference to relations, it is again clear that the mere association of images furnishes no sufficient ground for our awareness of likeness and difference, subordination and superordination, correlation, and all the other comparative aspects of experience. We may, therefore, conclude that the relatedness of things is an immediate fact of experience and that the purpose which guides our mental happenings is essentially a relating activity.

But a relating activity and the consciousness of relation are not the same. Relations are apparent among the elements of experience, but the relating activity is not necessarily a conscious fact, any more than is association. The mental activities are, as we have seen, both conscious and unconscious. At times we are aware of an attitude conducive to the establishment of relations, or to the revival of associations, but in neither case is this attitude a necessary constituent of the mental activity which establishes relationships or associative connections.

50. The Process of Ideation

We may picture the process of ideation as follows. Let us start with a concrete situation, perceptual in its nature. This involves attention and memory, and gives rise to tendencies determining the general course of the mental happenings that follow, as to both their contents and the general and specific bodily adjustments which result. In cases where the situation provokes an immediate adjustment, no idea need be formed, but, in other instances, where a physical adjustment cannot satisfy the immediate demands of the situation, the ensuing process is largely of a reflective order. Ideas are thus formed which are in part notional and in part imaginal, together with the conscious relations dictated by the situation through its directive tendencies. In this manner, past and present experience is organized for the purpose of future

adjustment. But although the primary material with which this synthetic process operates is given in the percept, with its associated notions and images derived from the past, ideation cannot be regarded as a mere aggregate of such elements. The relations established are many of them new, and they, in turn, contribute to the creation of notions that are formed for the first time. Thus the idea which results is in part a creative product, and represents a true development of the material primarily given. This is what is meant by *creative imagination*: the capacity to establish new relations and to form new notions on the basis of the contents supplied by direct presentation or revival of memory. As already pointed out in our section on the image, it is not new contents, but new syntheses, which are productive of these creative fantasies. "The light that never was on sea or land" transcends sensational and imaginal experience, not by its intrinsic uniqueness of content, but by the *meaning* which is attributed to it. It is, of course, true that imaginal contents are often altered in the course of ideation. Schematic images may thus be formed that are important adjuncts to the process of thinking. The images which serve us in reasoning are, therefore, not necessarily direct representatives of perceptual experience.

It is difficult to draw the line clearly between an idea and a notion. The notion is, however, strictly imageless and elementary, whereas the idea is

always complex, and may be in large measure imaginal. The idea is a synthetic fact founded upon notions, as a percept is a synthetic fact founded upon sensations. In its incipiency, the notion may be vague and general. As it develops into an idea it establishes relations founded on other notions and images, the appearance of which is directed, even if they do not actually arise in consciousness.

51. *Associative versus Directive Tendencies*

The process of ideation may be further classified by reference to two extreme types of reflective experience in which the purposes of consciousness are imperfectly served. These extreme types are often found in cases of mental derangement, but are also familiar in normal experience. The one extreme is afforded by an over-emphasis of the associative tendency, and the other by an over-emphasis of the directive tendency. The first instance is described as the chain-like process of thought. Every situation sets in readiness for revival, images and notions which memory provides. If the directive tendency fails to operate selectively among these various factors, they will arise in consciousness in accordance with their own intrinsic capacities, reproductive and perseverative. Each recurring fact will, in turn, associate others,—the result being a ‘flight of ideas’ which is, on the whole, incoherent and purposeless.

While the ‘flight of ideas’ is symptomatic of cer-

tain forms of insanity, it is by no means restricted to diseases of the mind. It is a marked characteristic of dreams, and is likewise found in the garrulous individual of slight intelligence, who 'runs on' from one idea to another, with little or no definite intention save to 'make talk'.

The other extreme is met when a certain direction of thought becomes dominant to such a degree that instead of permitting a rational development, the individual constantly reverts to the same idea. We call this a 'fixed idea', because the mind cannot seem to get away from it. This, too, is symptomatic in certain mental diseases, as in melancholia, where it is impossible to arouse the patient from an affectively toned prepossession of woe-begone impotence; or in the delusions of persecution which typify the paranoiac. But it is also characteristic of some normal minds that have fallen into the rut of prejudice. The man with 'one idea' which has been formed and hardened until it permits of no modifications is an illustration of this tendency.

It is between these two extremes that the process of ideation manifests itself as a truly progressive, synthetic operation. Without being at the mercy of every chance associative tendency that may occur, and yet resisting the tendency of too rigid a control, it steers its course amid the manifold data offered, selecting here, rejecting there, following the subordinate tendencies which arise with every modification in the situation, yet never

losing touch with the general aim inspired by the original problem. In this manner the simple process of ideation becomes a more complex process of *reasoning*, in which percepts and ideas supplant one another in the onward course of thinking.

52. The Psychology of Logic

The psychology of reasoning is a field in which some important work has been done, while much still remains undone. Anything approaching a detailed study of its various phases is not within the limited range of our present purpose. What has already been attempted is but a brief outline of the synthetic process of ideation. Yet we have seen that thinking and reasoning are but more extended processes of the same order. With the aim before us of securing an introduction to the contents and operations of mind in its more general aspects, there is not much more to be said on this topic. But it will perhaps be well for us to introduce a few of the terms with which Logic has made us familiar, in order that we may at least place them accurately with regard to their psychological bearings.

Judgment is the first of these terms meriting our consideration. The logician usually treats judgment as the element of the reasoning process. Psychologically, judgment is a relating activity. The terms related may belong to any of the elemental categories, although we cannot be quite sure that an affectional element as such can be related.

It appears more probable that a notion derived from the affection constitutes the term with which the process of judgment operates in this case.

The logician usually asserts that the relation of judgment is always *predicative*. Whether or not this involves a distinct and limited type of relationship is a question that is still debatable. Further research is requisite before the question can be definitely decided. It is evident that the judgment issues from a conscious problem, and is never a mere automatic process. Furthermore, recalling our differentiation of the stages of consciousness, we may observe that the judgment does not appear until the stage of potential knowledge, or the completely established fact is reached. It is absent at the stages of simple presentation and awareness. It always involves self-activity in the form of *an expression concerning a circumstance which is definitely known*. We must distinguish it from perception, in which the expressive act need not be present, and also from inference, which is a further development of the judgment.

Conception and *inference* are more complicated relational processes. Conception for the logician issues in a term, the *concept*, which embodies the essence of a number of judgments, and thus expresses in nuclear form the abstract or generalized meaning of a series of mental happenings. The process of *abstraction*, psychologically, is one of directing the attention to the dependent parts of a

situation. The isolation of these parts involves the creation of notional units which are detachable from the total situation and may thereafter be thought separately. The process of *generalization* is not different in kind, but rather in *direction*. The notion formed in generalization is one which involves the essence of the *whole* rather than of the part. But so far as concerns the simple judgments involved, they are all of one type. A concept is, therefore, nothing more than an idea derived from a more or less complicated succession of judgments. Whether the idea is expressive of identities among the parts of different situations, or of identities derived from a comparison of situations taken as a whole, is a matter of the direction taken by the process rather than a peculiarity of the judgments as such.

In the case of *inference* we have what the logician calls a developed judgment. This is but a series of judgments which have a certain trend or direction. The distinction from the process of conception is again a matter of purpose rather than of kind. The inference does not stress the formation of an abstract or general notion, but rather the serial development of the judgments. It terminates, therefore, in a judgment rather than in a notion or idea. The kinds of inference are usually defined as *deductive* and *inductive*. These describe the purpose in view, and the direction which the reasoning takes, whether it be from the more to the less comprehensive, or *vice versa*.

53. Summary

Ideation, then, is a synthetic process which operates with all the mental elements, but is founded typically upon the notional and imaginal orders of experience. It may be either simple or complex, brief or of long duration. Its varied possibilities compass all manner of relating activity, and all kinds of directive tendency. Certain phases of ideational activity are quite direct and automatic, but the more complex forms always issue from conscious problems with definite directions, and it is these, in fine, that constitute such diversified forms as creative imagination, recollection, and reasoning.

CHAPTER XIII

REACTION

54. Introduction

A FIFTH synthetic fact we shall designate as *reaction*. Thus far, we have considered mental happenings with reference to their content, their aims and tendencies. We must now devote ourselves to a discussion of the outcome of these happenings. Without knowing how and where they issue, we can have but an imperfect understanding as to their nature and general usefulness.

It is sufficiently evident from what has gone before that our minds are in intimate connection with bodies which we have described as of two general sorts: the external world of our environment, and the internal world of our corporeal organism. The environment stimulates us through our sense-organs, which may be termed the *receptors*, and we respond by adjustment of the muscles, or *effectors*. We describe this process as *reaction*. Life, as we know it, is a matter of constant adjustment and readjustment between these two worlds. When such adjustments cease, death ensues. It is within this system that mind operates to give aim and control to life-activities. Whether mind can exist without life-activities of this sort, and whether life can exist without mind, are questions which our present knowledge does not permit us to answer. But we have evidence of life with a mini-

mum of mental activity, and likewise of mind with a minimum of such life-activity as the word 'behavior' suggests.

55. Reflex Reaction

In discussing reaction we may begin with those simple forms in which the conjunction of receptor and effector appears to be most direct. We refer to these activities as *reflex*. The life-processes of digestion, circulation and respiration are all of this direct and seemingly automatic type. Certain characteristic stimulations: — food in the stomach, blood in the heart, air in the lungs, — are followed by adequate muscular and glandular responses, which eventuate in the assimilation of the food, the pumping forth of the blood, the expansion and contraction of the lungs. But there are also many other muscular activities provoked in a similarly direct and unintentional manner. We may mention the pupillary reflex of the iris, the accommodation of the optic lenses, the convergence of the eyeballs, the winking reflex, and the knee-jerk, as typical. It is customary to call these innate, that is, naturally inherent in the muscular mechanism concerned. Yet most of them are more or less crude and inexact at birth, and all are subject to experiential modification and organization.

It is our lack of knowledge concerning the original nature of these actions — how far they are assignable to purely mechanical causes, and how far

they may be conditioned by vague yet non-mechanical directions — which makes it impossible for us to answer the question whether or not life can exist without purpose. But however this may be, the incipient life-processes of the human infant, as well as the complete life-activities of many of the lower forms of organism, are largely conditioned by direct responses, in which the mechanical interplay of environmental stimulation and motor capacity of response are the prime factors involved.

56. Instinctive Reaction

The next step in the course of tracing the reactions of mind is furnished by the *instincts*. Instincts are also usually described as inherited tendencies of reaction. They differ, however, from the reflexes in being more complex and less direct. Furthermore, the question as to their mechanical origin and nature is even more pressing than that raised by the reflexes. The meaning of an instinct is found in the end which it serves, and this is not explained by considering it merely as an aggregate of reflexes.

Let us take as an illustration the nesting instinct in birds. We might suppose that certain stimulations of a complicated sort, arising from physiological processes involved in conception and in the development of eggs in the female bird, prompted a certain chain of reflex activities which resulted in the construction of a nest for the eggs. But the difficulty of such a view consists in the fact that

the reactions are not of this direct order. The bird must seek material for its nest, and a suitable place to build it. The process may involve all its motor capacities, and though each one be regarded in itself as a reflex, no mechanical explanation seems adequate to account for the actual behavior that results. It is only when we read these organic reactions in the light of an underlying purpose which determines the general course pursued, and holds the animal to its task despite all obstacles and distractions, that we seem to approach the true nature of instinctive activity.

When we describe the instincts as innate, we emphasize the fact that these purposes appear to operate with some degree of success the first time they are used. Experience is not responsible for their origin. The hypothesis which we seem obliged to accept is, therefore, favorable to the inheritance, not merely of certain organic mechanisms, but also of fundamental tendencies which guide the complicated activities toward ends expressing the needs and aims of organic life. It is not necessary, however, to regard these reactions as a result of conscious direction, such as we found to exist in the process of ideation. Yet we need not assume that they are entirely *blind*. In so far as we know such activities introspectively, we describe them as *impulses*. These are chiefly sensational experiences in which kinesthesia is the characteristic element. For theoretical reasons we may assume that a sensitivity of this sort, how-

ever vague, may reach back into the very incipiency of organic life. But also the origins of our thoughts, — the notions and relations, — may be traced back to this primitive capacity for instinctive direction. If sensations of some vague sort are the invariable accompaniment of all reflex acts, then notions and relations, though equally vague, may find their natural origin in those tendencies which direct behavior.

Instinctive reactions can, therefore, be regarded as complex organic responses which are reflex as to their individual nature, but are combined and synthesized by original directive tendencies of an innate order.

Instincts are numerous, and no very satisfactory classification has as yet been made of them. They are defined, however, by the most fundamental needs of an organism. They appear at different stages in development, as such fundamental needs are made manifest. Those which serve the purpose of self-preservation are perhaps the most essential and the earliest to appear. But aside from the tendencies to seek food and shelter, there is early evidence of acquisitiveness and curiosity, upon which are based most of the later achievements of the organism through the formation of habits. The group of reactions which centre about the process of organic reproduction and the attendant needs of caring for the offspring are also instinctive. In short, whatever behavior must be in some measure perfect or serviceable in its first

appearance, is provided for by the instinctive reactions.

57. Habitual Reaction

The plasticity or modifiability of organic reactions is manifest in the repetition of a purposive activity. These modifications are made possible by the retentive capacities which we have found to be at the basis of memory, and they lead to the formation of *habits*. Habits, which constitute the third step in the development of behavior, are complex reactions, relatively invariable with respect to the combination of reactions involved. They are characterized by the fact that they are acquired and not inherited, though they are but modifications of reflex and instinctive tendencies. A simple habit may appear to consist merely in a certain combination of reflex tendencies, as in the familiar illustration of the burnt child's fear of fire. Prior to the formation of this habit, there were the original tendencies: to grasp the bright object, and to withdraw from the source of the pain which followed. The habit of shunning this particular kind of bright object is formed when the tendency to withdraw is motivated upon the appearance of the object and before the pain is sensed.

Many ingenious explanations have been advanced to show how this modification in the original serial order of events is effected. Some refer it to the capacity to associate the two events and to react simultaneously to a situation which is in

part sensory (the bright object), and in part memory (the recollection of pain), the result being a conflict between the two motor tendencies, and consequently no reaction. For others, it is the resultant 'satisfaction' or 'dissatisfaction' which operates in the selection of the more suitable reaction, and thus binds the serial activities into one unit of behavior. A third group of theorists have attempted an explanation in purely mechanical terms, by the aid of hypothetical principles applied to the flow of the nervous currents.

The first kind of explanation is inadequate, because it is not evident that the child must recall his former pain in order to fear the fire. The second kind meets with the objection that too much is expected of the resultant affection, since it must needs have some capacity of a retroactive sort in order to attach itself to processes which, as originally experienced, possessed no such affective tone. If this is to be possible, a synthesis of the complete situation must be first provided, and it does not appear from what we know of affection that it has any such powers of grouping serial mental happenings together. The third kind of explanation, though satisfactory as far as it goes, is subject to the charge that it is purely hypothetical, inasmuch as our knowledge of neural activities furnishes us at present with little or no ground for the assumptions postulated.

In the light of the explanation which we have found applicable to mental happenings in general,

it may be suggested that this and all other modifications of reaction are made possible, not by the associative process of revival or the end-effect of a feeling-tone, but by the directive process issuing in the formation of a notion of some sort embodying the mental essence of the situation. Without the necessity of a concrete revival, the notion is given with the situation and is a formidable part of it. Thus, with the recurrence of the flame, it is no longer a mere bright light stimulating the reaction of grasping that is presented, but a percept embracing the meaning of the original situation as a complex event. The reaction thus involves not one but many tendencies, which accounts for the resultant inertia. To be sure, a habit of this kind is not always formed from one experience. In the case of the moth fluttering about the flame until it meets its death, we see a form of behavior in which the attractive force of the light stimulates reactions that are too firmly mechanized to be modified by the disastrous experiences ensuing. But in so far as behavior is modifiable, that is, in so far as the organism is capable of learning, we may attribute this to the action of the directive tendencies which are capable of adding some increment of *knowing* to what would otherwise be a mere accretion of sensations in serial order. Under the influence of directive tendencies that are originally but unconscious strivings, mere tendencies 'to do something', there develop synthetic units of behavior

in which serial activities are transformed and a perceptual type of reaction results. This selective activity accounts for the fact that these units are formed while the action is in progress, and are not dependent upon associated ideas or affections, such as those of 'satisfaction', which, in a strictly serial order, would appear only after the whole course of the original experience had been reënacted.

Any explanation in neurological terms must account for these general facts. While such an explanation is highly desirable, it can but afford a parallel for what we have thus far been able to describe in mental terms. Whether the directive tendency is in its essential nature a purely physiological activity, or whether it is in part or wholly a mental activity involving conscious potentialities of the notional order, is an open question. But our present information on the subject seems to favor the latter alternative.

We must not overlook the fact that serial activities of a purely reflex kind do become associated with one another. But if, in attempting to make our view of reaction systematic, we seem justified in the assumption that all life-processes have something purposive about them, it will be unnecessary to suppose that any combination of reflexes ever becomes fixed in habit-form without the operation of a directive tendency. This does not mean that all acquired forms of behavior are useful, but only that they *tend* to be useful, since they are

formed with some more or less explicit aim. Their relation to this aim may be quite remote, and the chance collocation of events may be of great importance in their formation. Yet we can say that they are always a result of some aim, whether it be primary or subordinate. Without such a direction the synthesis of a unified behavior involving selection and rejection would not occur.

58. Voluntary Reaction

We are now ready to consider the fourth step in the synthetic processes of reaction. This comprises the reactions which we term *voluntary*. That which has characterized the reflexive, instinctive and habitual reactions is their typical invariability, either with regard to aim or with reference to the serial acts performed. The voluntary reactions likewise operate upon the motor capacities at the disposal of the organism. They are different, however, in that they are not automatic, but possess a high degree of variability as to their combinations of reaction. This variability is chiefly afforded by the skeletal muscles, rather than by the glandular and muscular activities of those organs which subserve the more vital processes of life. Yet even these highly automatic systems are not entirely withdrawn from voluntary control. Purely mental conditions may influence the activities of digestion, circulation and respiration, so that many of our physical ailments are due to more or or less conscious inhibitions of these life-promoting

processes. But it is over those muscular reactions which are less constant in their periodic activity that we have the most direct voluntary control. We therefore call them 'voluntary muscles'. These are chiefly of the limbs, trunk and head. It is by their aid that we adjust ourselves to the environmental situation as it presents itself to us in constantly varying ways.

A great deal of detailed thought and speculation has been devoted to the question of man's freedom in initiating these reactions. While this is not a question that psychology is at present prepared to answer, it is one of great philosophic importance. Since any solution to be offered must be consistent with the psychological facts of the case, it is evident that these facts are worthy of a most accurate study. It is only within the last few years that such detailed studies of volition have been undertaken in the psychological laboratories, and not yet has the ground been completely and adequately covered. Prior to this, psychological theories of volition had been either speculative or more largely concerned with the reaction than with its motivation. Now, at length, we are coming to a more accurate understanding of these two phases in their joint operation. The most striking result thus far achieved came out independently in the investigations of Professors Ach and Michotte. It consists in the detection in all voluntary activities of what Professor Ach has called an 'actual moment'. This is described by the phrase "*I will actually*",

which indicates the clear consciousness of a subjectively determined reaction. The "I" appears as the cause of the reaction, and in the absence of such a conscious egoistic direction, is found the *differentia specifica* which sets off non-voluntary from voluntary reactions.

Here, then, is a basis for philosophical consideration relative to the freedom of the will. But the problem is not solved definitely in favor of individual freedom until we know more concerning the nature of the 'ego' which 'causes' these acts. The data at hand do not enable us to proceed at once to a satisfactory analysis of the ego, and we shall therefore postpone our consideration of it until we are prepared to take up, in Part IV, the general issues which our analytic and synthetic facts have furnished us.

A voluntary reaction is, then, one in which muscular coöordinations and inhibitions of the most variable sort are brought into play. It is furthermore a reaction which is initiated by a characteristic moment of egoistic direction. I, myself, am actuating the process. The direction is not blind, but conscious in its activity. This consciousness of a self-determined act is a unique moment, such as does not appear in any other form of mental happening.

59. Indirect Reaction

These four types of reaction, which, in a measure, form an evolutionary series, each step being de-

pendent upon the preceding steps, sum up the organic possibilities of reaction. But before leaving this division of our inquiry we must endeavor to understand some of the ways in which these different forms of reaction interplay in the life of the mature man.

We have already noted that life-activities, as they express themselves in the various forms of behavior, constitute the ground for an objective study which may embrace all living organisms. But we have dissented from the view that this study is the true scientific basis for psychology. On the contrary, we have maintained that the immediate psychological data are to be found in experience, and not in physical behavior, however important this latter fact may be for an accurate knowledge of mentality. We have also argued that the study of behavior, as a closed system of reaction-states initiated by sensory stimulation, gives us but an incomplete picture of the real causes operative in behavior. It has appeared from our arguments that without the postulation of purposive tendencies which, while at times unconscious, are nevertheless the active agents by whose means experience is synthesized and directed, we should be limited to a mechanistic conception of all human processes. But this ill accords with the facts as we know them.

Granting that consciousness may intervene between the external stimulation of the organism and its motor adjustment, the questions arise: Does

all consciousness issue in motor acts? or, may it sometimes proceed without reaching a motor terminal? We cannot at present answer. The theory of mind which accentuates behavior tends strongly to the first-named assumption. It is, of course, undeniable that the living organism exhibits a constantly varying behavior, the antecedents of which may in part be conscious. But this fact does not preclude the possibility of conscious processes that do not issue in motor reactions. An invariable connection between conscious process and motor process is, therefore, not demonstrated by the continuity of behavior in the organism. Neither is it necessary that we should reach such a conclusion from the study of the nervous system. This teaches us only that the brain-paths afford a vast number of motor discharges, but there is nothing to hinder the assumption that some nervous activities within a total group may expend their force entirely in the central nervous system and thus never reach a motor terminal.

The question is not, however, a pressing one for us to decide. On either assumption, we must grant that some processes are relatively direct in their motor response, while others are very indirect. In the latter case, we find incipient discharges occasioning many reactions which are tentative, or at least not immediately adjustive, together with an accompanying experience of kinesthesia.

In this group of indirect reactions are to be found many that are of the greatest value to us, though

they appear of comparative insignificance as physical events.

1. *Language*

The communicative expressions forming the basis of *language* are reactions of this sort. They include gestures, sound-utterances, and all those complicated activities by means of which we are able to express and communicate our ideas to others. The feature of prime importance is not so much the adequacy of the motor response in its immediate effect upon environmental conditions, as its representational and symbolic value. In their origin these reactions have root in the same motor capacities we have already discussed. It is because of their usefulness as agencies of communication that they differentiate themselves in their process of development from the more direct phases of adaptive adjustment. An animal finding itself in a critical situation is excited to motor reactions of the most diverse character, among which are those resulting in the utterance of sounds, such as cries and howls. These are of greater service for communication at a distance, than the movements which are more directly adaptive. They may, therefore, be regarded as possessing a peculiar survival-value. Language seems to evolve largely from this fact. But it is noteworthy that in the animal kingdom below man, the development of this order of reaction is comparatively slight. Many have regarded this as an indication

that animals other than man do not think, since thinking is so closely allied with linguistic expression. This conclusion is, however, not fully justified, since, as we have seen, thinking is not a mere matter of expressional activity, but depends rather on the capacity to form notions, and this capacity, so far as we can tell, reaches back to the very beginnings of conscious life. Yet there can be no doubt that thinking is greatly aided by the ability of representational or symbolic expression. Without this ability, the organism can be regarded as thinking only in so far as it is engaged in active adjustment to its environment. The development of linguistic symbols goes hand in hand with those needs of the organism that transcend the immediate environmental conditions. We are thus able to give expression to our revived experiences and work them over into new syntheses which will be of use in the future.

But it is a mistake to regard an individual's thinking as entirely and adequately expressed in his reactions. What we know is often much more than we are able to express. The process of education must emphasize both accretion of knowledge and ability of expression. The two should be related in the most intimate manner. Yet the fact remains that the two processes are not identical. We have already shown that it is quite conceivable that a conscious process should play out in the higher centres of the brain without ever reaching a motor outlet. If such processes be also regarded

as reactions, their end-results would usually, perhaps always, be imaginal. But they would not consist exclusively of images, for the more frequent terminal result would be an idea which is at once imaginal, notional and relational. This, in turn, must find expression in words, gestures or pictures before it can be communicated to others.

In these reactions, it matters little what their exact motor nature may be, provided the result is understood. To be sure, the specific reactions do not arise in an arbitrary manner. We have already noted the peculiar survival-value of sound-utterances for communication. It is also highly probable that certain general types of symbolic response — for instance, those which are affectively agreeable or disagreeable — are directly determined by fundamental organic conditions. Yet we all know that despite many typical likenesses there are also wide differences in the linguistic developments of different peoples. Even in the case of gesture-language, there exists a great diversity of forms to express the same thought or intention. It might appear that nodding the head forward is a most natural mode of expressing assent. Yet among the Greek peasants, assent is indicated by a sharp backward movement of the head. Certain words, such as *mama*, *papa*, *baby* and the like, seem to be more or less in use in all languages. This is attributable to the fact that these articulations are among the earliest forms which the speech-organs permit. But the definite asso-

ciation of such primitively natural types of expression with specific meanings that can serve as a basis for further linguistic development, is still a problem which seems to involve many more or less fortuitous and arbitrary conditions.

2. *Imitation*

Imitation is usually regarded as a prominent feature in the development of speech-reactions, as well as in many other phases of the learning-process.

It appears to be one of the most evident types of behavior among animals and children, and is doubtless based upon an instinct. Self-imitation, or the serial repetition of an action, seems to be a natural thing, which can be readily attributed to physiological mechanisms. But the imitation of others affords a problem not so readily solved. Imitation of this sort consists in the capacity to react in a manner approximating the behavior of the object perceived. This would seem to indicate that perception involves motor tendencies which lead to a direct duplication of the type of behavior presented in the stimulus. Thus, the facial expression of a person speaking is often directly imitated by the listener.

Sympathetic response of this order is a conspicuous fact of behavior. It is not limited to a conscious endeavor to copy the acts of another. The imitator is often quite unconscious of his response.

Furthermore, imitation is not restricted to the behavior of other living beings, but extends as well to inanimate objects.

An important phenomenon based upon this general tendency to imitate is known as *empathy*. This is a conscious, affective mode of projecting oneself into the object perceived. One feels oneself flying with the bird, striving upwards with the tower, or flattened out with the level plain.

The sense of empathy is not necessarily involved in imitation, because imitative reactions may be quite direct and unconscious. But the imitative instinct is unquestionably the foundation for empathy. Without this unconscious tendency to duplicate the characteristic pose or bearing of an object, there would be no basis for the conscious feeling of identity with the object which empathy affords.

This tendency to project the self into one's surroundings is, however, not identical with conscious imitation. Here we have to deal with the solution of a definite problem. In learning to drive a golf-ball, the conscious effort to duplicate the muscular coördinations of the instructor does not usually lead at once to a successful performance. Indeed, we often note in such cases that when success is achieved it appears to come as a matter of chance. We 'hit upon' the correct coördination rather than intend it.

This fact reveals the difference between in-

stinctive and consciously directed imitation. It sometimes appears as though our conscious efforts interfered with the natural response evoked by the situation. Of course, we need not suppose that our innate capacities would make it possible for us to imitate correctly a complex series of actions the first time. Nor is our conscious effort the only thing which stands in the way of a successful performance. Yet something of this sort does happen. The imitative instinct acts, so far as its capacities warrant, in a direct and automatic fashion. Bringing the instinct under the control of the will results in much the same kind of spasmodic and ineffectual response as does a conscious effort to control each step in walking.

As to the extent of our imitative capacities, very little is known. Some think that it is considerable, and thus find imitation at the root of numerous acquired abilities. Others are more sceptical, even to the point of denying that imitation is instinctive. They regard the typically direct, unconscious, imitative response as based upon homogeneity of needs. They maintain that typical situations bring typical responses in all the members of a species. It is the uniformity of human or animal nature which provides these apparent approximations in subjective and objective behavior. We are not, they think, justified in assuming any necessary correspondence between a percept and a motor response which tends to duplicate the action perceived.

Before this question can be settled, more experimental data must be secured, but the present trend of our observations favors the belief that imitation is a true instinctive tendency, however limited its capacities may be.

3. *Play*

Play-activities are an important source of behavior-development. These are in a large measure instinctive, and represent partial adaptations to the fundamental needs of organic life. They arise also, in part, from the sheer restlessness of animal life. But for these constant and repeated reactions in the earlier stages of physical growth, the organism would be unable to fit itself adequately for the more critical activities demanded by its nature. Instinctive determinations bring about coöordinated reactions. A constant physical growth and development, anticipative of later needs, is thus made possible. We refer to these activities as play when the purpose they appear to serve is not an urgent demand. But it is not evident that the little girl playing with her doll is impelled by a force essentially different from that which causes a mother to perform acts of service to her child. The urgency of the need in the two cases is a purely relative affair. The instinct leading the little girl to play with dolls may be regarded as the same instinct of motherliness which in later years will guide her in the more critical situations of real motherhood.

60. Summary

We have mentioned but a few of the characteristic reactions which go to make up the behavior-aspect of mental happenings. Yet our limited discussion may serve to indicate the place of reaction in a general psychology, and its importance in realizing the demands of experience. The conclusion we reach is that the intervention of consciousness between the receptive excitation and the motor response is a real agency for synthetic coördination of both the conscious data of experience and the ensuing reactions. These receptive and these motor capacities are inherent in the physiological nature of the organism. It is, however, the fact of *selective* and *directive* behavior which gives evidence of a growth and progress without counterpart in the realm of inorganic activities.

CHAPTER XIV

EMOTION

61. General Considerations

THERE remains for our consideration a sixth synthetic fact, and with it we may conclude our study of mental capacity and ability. This fact is generally designated as *emotion*, by which we shall mean the affective syntheses of experience.

We have had little to say of affection since we described it as an elemental content of consciousness. We must not conclude from this, however, that affection has had no part to play in the various synthetic processes with which we have been engaged. On the contrary, there are no mental happenings, — perceptual, ideational or reactive — that may not be affectively toned. But it has seemed best, since it is possible to experience these various syntheses in a setting of affectional indifference, to reserve our consideration of the affective syntheses until now. This reservation appears desirable when we consider the *dependency* of affection upon the other mental contents and activities which any situation presents. Affection we found to be always an *actual* and never a reflected or revived state of consciousness. Although there is a possibility that it may manifest itself as an independent element and thus take its place in the course of experience on the same level with the sensations, images and thoughts, this has not yet

been clearly shown to be true. Affection usually stands synthetically in most intimate relationship with the perceptual and ideational processes we have described. Indeed, so far as we are able to trace the affective syntheses, we find them to be always conditioned by the dispositional, perceptual, ideational and reactive syntheses which they attend.

Thus the dispositional characteristics of a person are responsible for his *moods*. These constitute an affective coloring, pleasant or unpleasant, which, while not permanent, may nevertheless continue for periods of a day or week. They are usually correlated with habits, because they appear to be acquired in the course of experience. *Temperament*, similarly, designates fixed and permanent tendencies of affective tone. These are, in part at least, instinctive, and form the foundation of what we term *individuality*. They appear early in life and continue with great persistency. There can be no question but that such tendencies as these are intimately dependent upon the coördination of the most varied factors,—physical, physiological and mental. Individuality and disposition are, indeed, in large measure affective tendencies, partly innate, and partly acquired. The perceptual units bring into play affective syntheses which are, to a considerable extent, attributable to the nature of the relations established within the percepts themselves; but these affective syntheses may also reach beyond the perceptual content to the individual

peculiarities and disposition of the perceiver. Ideational units, in turn, occasion affective phenomena, alike independent of other facts, and expressive of the larger aspects of the total mental situation. Mental activity as such is the source of the feelings of empathy, which we have already mentioned in discussing imitation. The affective side of this fact of experience is not readily analyzable. But it is here mentioned as a typical instance of an affective synthesis founded chiefly upon a mental activity, and providing us with an intimate sense of relationship to our environment. Finally, reactions of all sorts are a fruitful source of affectual syntheses, as is evident from the difficulties we find in clearly differentiating our feelings from the kinæsthetic and organic sensations which result from motor and glandular reactions of the body.

We can indicate these general features of affection by aid of a formula which Professor Külpe has given us:

$$A = f [I, D, E (s, c, a), R (i, m)]$$

Affection thus appears as a function of individuality (I), disposition (D), excitation (E); whether it be a sensory stimulus (s), a content (c), of any order, or a mental act (a); and reaction (R), either ideational (i) or motor (m).

A few words will be appropriate here concerning the definition of Individuality and Disposition. By individuality we mean the total aspect of a being as an initiator of mental processes, whether

these be conscious (with or without egoistic direction) or unconscious. It thus appears to be a wider concept than *personality*, which may be described as self-conscious individuality. It embraces individual differences, and is the basis of *character*. Individuality expresses itself through dispositional capacities and abilities latent in the psychophysical organism. Disposition, therefore, consists in tendencies based upon habit and instinct which are revealed in the expressions of individuality. We shall discuss Personality and Character at greater length in Part IV.

62. Three Groups of Affective Syntheses

The formula given above makes it clear how wide-reaching and various are the conditions of the affective syntheses. We can distinguish three groups of affective syntheses which operate within this general setting: —

1. *Particular and Common Feelings*

We have the *particular* and the *common* feelings. On the one hand, there are the relatively simple feelings which attach to separable contents,—sensations, and percepts,—images, thoughts and ideas. On the other hand, there are the common feelings, which are more inclusive and general, attaching themselves to mental activities and at times appearing to color the entire stream of consciousness. ‘Mixed’ feelings are explained by this distinction. While the total or common feeling is

pleasant, the particular contents may be of varying sorts, pleasant and unpleasant. This fact furnishes the key to certain difficulties raised in our consideration of affection as an element of consciousness. The query was then made: How can a tragic situation be artistically agreeable? The answer is that separable contents may retain their unpleasant feeling-tone, while a synthesis of the whole is secured by artistic means in a manner that is pleasant. Such syntheses also account for the tendency of our *interest*, which is a pleasant feeling, to attach itself to situations that can be analyzed into possibly disagreeable particulars.

2. *Active and Passive Feelings*

We have *active* and *passive* feelings accompanying conditions of excitement or quiescence, both mental and bodily. Pleasantness and unpleasantness may attend either sort. The character of the synthetic product depends upon the nature of the mental happenings as a whole, with special reference to the directive acts which are operating. In speaking of mental happenings as active and passive, we must, of course, bear in mind that such a distinction is purely relative. All experience is essentially dynamic, yet a distinction can be made between simple presentations, the occasion for which is primarily objective, and the appearance of contents and activities which are subjectively directed. The feelings that attach to these two classes emphasize this distinction, and justify the

use of 'passivity' and 'activity' to describe the difference of attitude involved.

3. *Shock and Mood*

We have feelings of *shock*, which are sudden and fleeting, and feelings of *mood* or *humor*, which are slow-rising and relatively enduring, thus constituting an affective tone, or 'frame of mind'. These syntheses have a close relationship to those of the first class, but they are not identical, since the differentiation in the first instance was that of the partial to the whole process. Here, it is the nature of the temporal aspect which furnishes the basis for synthesis. It is evident that not all particular feelings are in the nature of shocks, and not all common feelings indicate a frame of mind.

63. Synthetic Types: (1) The Sentiments

From another point of view, we can distinguish two large classes of affective syntheses, which involve in various degrees the three groups just enumerated. These may be designated as *sentiments* and *feelings of agitation*. The latter class is commonly referred to by psychologists as emotion. The use of this term, however, in ordinary discourse is more general than the one thus implied. We have, therefore, taken it as a general designation for all affective syntheses.

By sentiments we mean common feelings, either active or passive, which are also enduring, and thus constitute a frame of mind. There are intellectual

or logical sentiments, which attach to our reasoning processes; there are æsthetic sentiments, which attach to our appreciative moments; there are moral or ethical sentiments, which attach to our voluntary conduct; and there are religious sentiments.

That which permits us to class these four diverse types of experience under a common head is the principle of *conformity* or *non-conformity* in experience. Sentiments arise from common feelings, attaching to experiences in which the formative aspect is prominent. The integration of mental happenings into a conformable whole may be effected by various and diverse means, but there is always an element of conscious direction manifest. This makes the result a peculiarly intimate and highly organized experience.

Among the various conditions giving rise to sentiments are certain mental processes which may be described as *economical*. These occasion conscious conformities, both perceptual and ideational, which result from instinctive and habitual tendencies. Thus we find certain relationships existing among tones, colors, linear dimensions, shapes and sizes, odors, tastes, cutaneous experiences and the like, that seem to render them immediately conformable in their sheer sensory nature. We may describe such facts as giving evidence of a mental economy, because their main characteristic appears in the facility with which they fit into the perceptual units of which they form a part. While in large measure they are the result of fre-

quent experience and may, therefore, be called habitual tendencies, they are also, many of them, original so far as we can judge, and require no repeated occurrence to be adequately formed. We do not have to learn to enjoy the touch of soft and smooth objects, or to dislike rough and unyielding surfaces. Sweet tastes and fragrant odors are immediately preferable to bitter tastes and fetid smells. Among spatial percepts, even lines, whether straight or curved, are more acceptable than broken and irregular contours. Proportion seems also to be in some measure founded upon economy of mental process. Equals are more favored than unequals. The balanced and symmetrical are immediately detected and preferred to unbalanced and unsymmetrical forms. In color-combinations we favor the complementaries, or the closely related intermediates, rather than certain of the wider differences found in the color-series. As for sounds, we have already noted the perceptual units afforded by rhythm. Similar rhythmic units occur also in the other fields of sense. The tonal relationships, which have been mentioned as the foundation of music, afford a still more striking example of conformities based upon mental economy. These occasion both the tonal fusions of concordance and the lack of fusion which results in discordance. Such an economy is also apparent in the relationships of successive tones,—the ease of transition from one tone to another near it in pitch. Other examples

are furnished in music by the effect of *terminal resolution*:— the demand for the keynote in a melodic sequence is well known. A somewhat analogous but differently based demand is that of the ‘falling inflection’. We seem to end a series of sounds more satisfactorily on a low pitch than on a high one. This is evident in speech as well as in music.

All these facts are partly based upon habit. Many of them, however, are more deeply seated, being bound up with the sensory mechanisms. The common feature is that they present us with perceptual units which evidence facility of mental activity in the presence, and lack of facility in the absence, of certain fundamental relations. They are, therefore, the immediate occasion of an affective tone, either pleasant or unpleasant. Such an affective tone may or may not arise in the experience, yet the possibility at least is afforded for the arousal of a sentiment.

But it is not merely these sensory conformities and non-conformities which underlie our sentiments. Purely ideational units complying with frequent aims and desires, or showing marked discrepancies with our usual mental processes, are also adequate bases for sentiments in reasoning and reflection.

Taken by themselves, these evidences of mental economy, or its opposite, furnish only occasional feelings, such as are sufficiently accounted for by the categories of particular and common feelings, active and passive feelings, shocking and enduring

feelings. But they also constitute a basis, both perceptual and ideational, for a higher synthesis of affection, in which our whole being seems filled with a sense of the conformity or non-conformity of the situation. It is these feelings that we denote as sentiments. Oftentimes they are based upon *intuitions*. We have intuitions of truth and falsity, beauty and ugliness, morality and immorality. The religious experience of exaltation and dejection, mystical and sublime, is also in part intuitive. The significance of intuition consists in its apparent directness. Thus we are furnished with a foundation for *belief* on the immediate basis of dispositional tendencies. Being filled with such a powerful and assuring sentiment, we do not search for inferential grounds to substantiate it, but accept it at once, and act accordingly. All our beliefs may be regarded as having something of an intuitional sentiment attaching to them, but although direct in their appearance, they are founded on all manner of past experiences, some parts of which have been quite uncritical and others highly critical. A belief is therefore an ideational synthesis to which is attached an intuitive sentiment, the exact nature of the intuition being dependent upon the type of individuality and education we possess.

1. *Logical Sentiments*

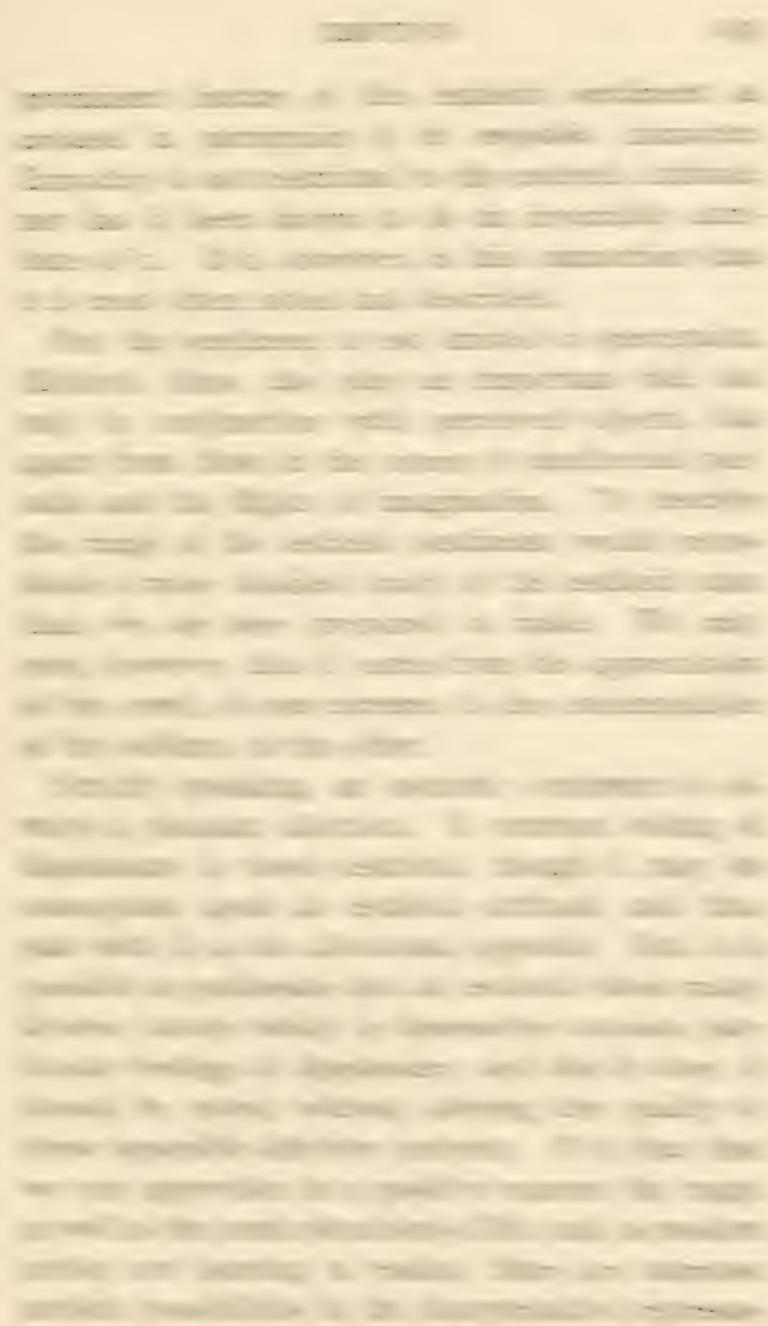
We may now refer briefly to the four groups of sentiments which we have distinguished. In the

first group of logical sentiments, we have referred to the feelings which color active reasoning processes. No passive feelings are found in this group, since the process of reasoning is in its nature active. It is, however, as already noted, impossible to draw a hard and fast line between active and passive states. But the sentiments which occur in the course of reasoning are only occasioned by the appearance of peculiarly conformable or non-conformable ideas. These occasion the excitement which is a necessary constituent of the sentiment. For the most part, our reasoning proceeds in a condition of affectional indifference. It is when we meet with obstacles in the procedure of our argument that sentiments of dissatisfaction appear, while the occurrence of an illuminating thought of wide perspective may occasion a sentiment of satisfaction quite in contrast with the ordinary dispassionate processes of the rational mind. Logical sentiments may approach the order of shocks in the suddenness of their appearance, but they can also be aroused gradually, and are usually of some appreciable duration.

2. *Æsthetic Sentiments*

The æsthetic sentiments form a group offering much larger possibilities for investigation, into the details of which, however, we shall be unable to enter. As a general subject-matter, Æsthetics, like Logic, belongs to the issues of psychology rather than to the synthetic aspects of affection. Yet it

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tation of facts that are individually ugly and even distressing.

3. *Moral Sentiments*

Moral sentiments attach themselves to certain lines of voluntary conduct. These are social activities which aim chiefly at justice and goodness. The conformities here apprehended are always self-initiated, and involve definite types of behavior.

Moral sentiments always arise from common feelings. They are always active, but may be either brief and shock-like, or slow-rising and enduring. They are both pleasant and unpleasant, according to the conformity or non-conformity of the situation involved.

4. *Religious Sentiments*

The sentiments arising with the religious attitude have a peculiar poignancy. They are founded on common feelings, are either active or passive, shock-like or enduring, and they indicate all nuances of pleasantness and unpleasantness. This latter fact indicates a differentiation from the æsthetic sentiments, which, as we saw, are essentially pleasant. Religious dejection is, however, too real an experience to be regarded as but a partial content in a larger synthesis of joy. The contemplation of God runs the gamut of our total affective states, and the sentiments involved are varied, such as awe and reverence, power and weakness.

64. Synthetic Types: (2) Feelings of Agitation

There remain for our consideration the *feelings of agitation*, or emotions, in the more restricted sense of that term. These are distinguishable from the sentiments we have been discussing by the special nature of the reactions to which they are attached. The situation giving rise to an emotional outburst is one in which an adequate adjustment is impossible. There follows a more or less chaotic series of impulses, involving instinctive and habitual types of reaction, and reflecting a mass of kinæsthetic and organic sensations which fuses with our percepts and ideas to form the basis of these characteristic feelings of agitation. Anger, rage, resentment, passionate love, joy, sorrow and the like are the states resulting in such instances. Pleasure or displeasure is often dominant, though not always, for the affective elements may be numerous and conflicting. An object or occasion for the emotion is always prominent, at least in the early stages of the agitation, and the reaction is more or less characteristic of the cause. Thus the clenched fists and taut muscles of anger contrast with the flabby collapse of poignant grief. Many other reactions, however, are more arbitrary in their appearance. Blushing and pallor, the various disturbances in breathing, those associated with the digestive processes, with movements of the diaphragm and the œsophagus, are all likely to appear in any state of acute agitation. It there-

fore does not seem possible to describe these violent affections in terms of certain type-forms of reaction, with their attendant sensations, as is attempted in the theory which bears the names of James and Lange. But the contribution to our knowledge of emotion which these investigators have made is no less real on that account, for it is undoubtedly true that without these kinæsthetic and organic sensations there occurs no feeling of agitation.

The phenomenon seems to be essentially one of 'letting off steam'. With a situation which seizes upon our whole being, tendencies are aroused whose energy cannot be adequately drained off through the ordinary channels of adjustment, either central or peripheral. The result is an overflow into those channels offering the least resistance. In the main, these are the channels most fundamental and most frequently in use. The result is a more or less violent reaction in glands and muscles, many of which are ordinarily automatic in their activities. The vaso-motor, the respiratory and the digestive tracts furnish, perhaps, the most prominent components of these reactions. But the voluntary muscles may also be involved, thus giving rise to the more typical expressions of the different states of agitation, and also inhibiting one another until the individual thus seized evidences, at times, a complete lack of control over his behavior. The attention ceases then to be focussed upon the object which has caused the agitation; the individual is 'beside himself', as

we say, and a highly affective stream of sensations is the very marked content of his experience.

The feelings of agitation are common feelings. They are always active, and usually of the shock-variety, rising suddenly to a considerable intensity. But they often continue for some time, and may be gradual in their appearance. The amount of agitation which is aroused varies greatly on different occasions. While the typical fully developed agitation pervades our whole being at the expense of all other processes, it is not impossible for it to be controlled by a higher synthesis, which subordinates it to a simultaneously appearing sentiment. Thus we often experience complex emotions, simultaneously with the æsthetic, moral and religious sentiments. In such instances, the background feelings of agitation lend a vividness to the experience without necessarily disrupting the sentiment superimposed upon it.

65. The Significance of Emotion

In concluding our discussion of the affective syntheses, mention should be made of the part played by affection in mental life as a whole. Since practically all our mental operations can be performed without affection, what service do they render in their seemingly sporadic appearance? Many different views are entertained regarding this problem. They vary all the way from those which see in affective phenomena the most original and primitive of mental facts, to those which re-

gard them as but epiphenomena of no real service-value for behavior.

The position we are justified in taking in view of the foregoing discussion is intermediate between these two extremes. To assume that pleasure and displeasure exist prior to the elements of sensation and thought does too great a violence to the facts of affective experience as we know them, for on such an assumption we should be at a loss to understand how these elements have evolved, and we should also be obliged to accept the independence of affective elements, which we have found to be very questionable. On the other hand, to regard affection as a mere epiphenomenon would stamp our inquiry as incomplete, since we should then have no satisfactory basis for explaining its appearance.

We have seen that typical emotions attach themselves to characteristic reactions in a manner which indicates the survival-value of these reactions, but it is not clear that the feelings are themselves agencies for mental or physical development. As has been pointed out, there are serious organic disturbances (such as arterio-sclerosis, diabetes and tuberculosis) which do not express themselves in unpleasant affections, while there are conditions of physical health coincident with unpleasant moods, such as regret and disappointment. It follows that pleasure and displeasure are the expression not only of bodily conditions, but also of mental conditions which may be quite remote

from our bodily well-being. But if we cannot identify these affective states directly with organic needs, we can regard them as *conducive* to results that are on the whole beneficial. A pleasant affection is thus conducive to a satisfactory fulfilment of our obligations and may discover a solution to our daily problems, while an unpleasant affection warns us against dangers and obstacles in our paths. As for the exact manner in which an affective state may influence mental happenings, this is a problem that, with our present knowledge, we are unprepared to solve.

Part IV

THE ISSUES OF
PSYCHOLOGY



CHAPTER XV

MIND AND BODY

66. The Directive Tendencies of Mind

IN Part II of our text, we endeavored to analyze experience, with the object of determining its elements. We found our analysis complete in the distinction of four classes: *sensation*, *image*, *affection* and *thought*. These, with their attributive aspects, and the physical and physiological facts which condition their appearance, furnished us with the structure- or content-basis for understanding the phenomena of consciousness. In Part III we attempted to understand the nature of the fundamental syntheses in which these facts are brought together to constitute the stream of happenings we designate as mind. We have described these syntheses under six heads: *attention*, *memory*, *perception*, *ideation*, *reaction* and *emotion*. In each case, we have found our synthesis to be dependent in part upon unique tendencies, which seem to transcend the limits of a mere assemblage of elements, even when we are most careful to trace the influences attributable to the physical and physiological conditions of life and experience. These tendencies, then, which are termed the *directions* of experience, have become a central feature in our explanation of mind. We are, therefore, bound to give them some further consideration as to their nature and origin, in order that

we may be justified in regarding them as scientific facts. In what has gone before, we have not done this in any complete and systematic manner. We have rather assumed the existence of such tendencies, and have then proceeded to show how they operate, in explanation of the fundamental syntheses which our problem made apparent.

Our procedure was, however, justified by the following considerations: (1) The mental activities are not always conscious. When they are conscious, they indicate an *attitude* or a dynamic aspect of experience which is not analyzable into elements of content. (2) The existence of these tendencies is often revealed only *retrospectively*, as being the logical prerequisite for certain synthetic formulations and processes which we should otherwise be at a loss to account for.

It appears, therefore, proper that we should have postponed a more detailed inquiry into the exact nature of these activities, until we could have before us the principal synthetic facts from the existence of which they are inferred. We are now in a position to undertake this inquiry, and then to work forward to certain conclusions regarding the nature of mind in its more general aspects. Let it be clearly understood, however, that the inquiry which we are now to make must be in large measure theoretical. It will consist in a comparison of various possibilities, rather than in the clear-cut definition of a scientific principle; for while our evidence shows that such a principle is indispensable

to the operations of mind, it does not, at the present stage of our knowledge, indicate the exact and final form which this principle will assume.

67. Their Bearing upon the Relation of Mind and Body

The first question arising in connection with these directive tendencies is that regarding their nature. We have shown that they may operate even when unconscious. Does this mean that they are essentially physiological, or are they something more than this? At once we are plunged into a speculative problem concerning the relation of mind and body, and the nature and function of the problems which serve as the point of departure for all such directions. If we accept one horn of the dilemma, we may argue that a complete causal series is operative in all mental happenings, its terms being entirely physiological, *i.e.*, physico-chemical, in their nature. What appears as a purpose in consciousness is but an illusion, for consciousness itself is but a reflection or concomitant of material processes, which are carried on with the inevitableness of all physical activities.

68. Epiphenomenalism and Parallelism

A theory of this order is maintained in two principal forms. The first regards consciousness as a series of *epiphenomena*, or adjunct reflections which have no real bearing upon the underlying

processes that occasion them. There are serious objections to such a theory. Not only does it seem unwarrantable that we should be called upon to renounce as useless that to which we attribute the greatest value in life, namely, our conscious endeavors, but also it is difficult to understand the appearance of these epiphenomena without any apparent loss in the energy which occasions their origin. A transformed energy is still an energy, and while consciousness may be regarded as necessarily correlated with and conditioned by nervous processes, the epiphenomenon is something unique and distinct from the nervous processes.

Another hypothesis is more often favored. This assumes that mind and body have distinct but *parallel* processes. It may be formulated in various ways. Sometimes it is regarded as a mere working hypothesis, the idea being that all conscious processes have a physiological correlate, leaving open the question as to whether all physical processes have a conscious correlate, with the implication that they do not. Thus, the final explanation of mind is sought in bodily activities which go on even when an adequate conscious correlate is not to be found.

But while this hypothesis may tacitly avoid any attempt to account for the parallelism it assumes, it cannot escape the problem of explaining this parallelism. Furthermore, one is in constant danger of committing the scientific error of attributing to unknown causes all things which are not imme-

dately revealed by consciousness. Not content with this, the parallelistic metaphysician usually adopts a monistic theory, in which mind and body are regarded as the universally paired manifestations of a fundamental metaphysical substance. This substance is then regarded either as an 'unknown', or as a partially known essence, more nearly akin to mind than to matter. This latter view may be described as *spiritualistic monism*. That such a fundamental substance should not be regarded as material is attributable to the difficulties which we have already encountered in the epiphenomenon theory. Metaphysically, it is easier to derive matter from mind than to derive mind from matter, because mind is the more immediate datum of the two. Such a spiritualistic monism obviates some of the difficulties in the way of effecting a union between conscious purpose and mechanical causation, and thus carries us to the other horn of the dilemma.

Since the ultimate essence in all things is neither the mental nor the physical, as we know them, it is conceivable that strict mechanical causality is but a half-truth which works with more or less exactness, but is, at best, only an arbitrary approximation applying in some fields of happenings and not in others. From this point of view, the progress of existence may be regarded as a complicated stream in which the interplay of events constitutes a causal sequence, without ever entirely setting aside the dominant progressive purpose

that informs the whole and gives it its general trend.

The difficulty involved in this view is the one which arises from the necessity of regarding all things as possessing the double aspect of mental and physical. Wherever life manifests itself, there is some basis for the assumption of such a union of these refractory elements: — the mental and the physical, the purposive and the causal. But in the realm of inert matter we must draw largely upon our imagination to make this view cogent. And when we do so, the result shows every evidence of that violence which we do to a set of facts whenever we force them to fit a scheme that they themselves do not directly warrant. The law of strict causality is quite adequate to all the facts which inert matter has revealed to us. It is only in the realm of life-activities that we find a need for something more than this blind interplay of energies.

69. Interaction

If we regard this need as sufficiently well grounded to enable us to reject a strictly mechanistic interpretation of life, we shall be better served by an *interaction* theory. Here we can hold to a simple working hypothesis: that what we call mind or purpose interacts with what we call matter in its mechanically determined relations. In this case we do not attempt to decide the metaphysical question as to ultimate substance, whether it be

one or many, known or unknown. But we do maintain that the mechanistic conception is incomplete, for, in addition, there are purposive acts directed upon definite aims which are operative, at least, in life-activities. The directive tendencies that we have been able to trace in mental happenings are the expressions of such purposes. While they always operate in a mechanical setting, and while their physical results are always of the causal order, a direction is really given them from without this chain of causal events.

It is with this hypothesis that we shall rest, because it appears to be the most adequate one to embrace the facts set forth regarding mental life. Its advantage over a monistic parallelism, which attempts to include purpose in its scope by reference to its spiritualistic foundation, is evident from the fact that it does not require that every fact shall be at once mental and physical. Its chief difficulty arises from the seeming contradiction offered to the law of the conservation of energy. This law has proven itself so variously useful and adequate in scientific procedure, that one is naturally loath to run counter to its fundamental assumption. Yet we must remember that it is an assumption and not a thoroughly demonstrable fact.

It is not, however, certain that the universality of this law need be contradicted in order to establish the possibility of purposive behavior. The law only maintains that the quantity of energy is

finite, and that from that quantity nothing can be added or subtracted. Energy exists, however, in various forms, potential and kinetic. The problem of mind as interacting with a body of energy does not necessarily mean a loss or gain in this finite quantity, since we need only assume for mind a peculiar capacity to *direct* energies toward definite ends. The exact conditions for such a workless direction are at present quite beyond our knowledge. We have as yet no sufficiently adequate conception of nervous energies to venture a satisfactory hypothesis. Such an hypothesis, however, is not impossible, and therefore is not necessarily at variance with the known facts.

70. Summary of the Argument

To summarize our argument, the dilemma requires us to accept either a thoroughgoing mechanistic conception, or a conception which provides for both mechanical causation and purposive activity. While the first-named conception is supreme in the physical world, and has many staunch supporters in the biological world, it is not satisfactory to psychology, since it relegates mind to an anomalous position. If we accept this alternative, the origin of mind becomes a complete mystery, and we can find for it no use whatever.

The second alternative regards mind as an original purposive element, which in some respects transcends the causal sequence of physical happenings. This conception is consistent with the theory of

parallelism if we assume that the underlying foundation for the corresponding and inseparable manifestations of mind and body is in its essential nature spiritual, and therefore not subject to the law of causation. To make this view complete, however, it is necessary at least to maintain that every neurosis has its psychosis, and every psychosis its neurosis. The theory of interaction does not require this thoroughgoing correspondence, since it maintains that the purposive and causal series interact. A direction is thus given to certain processes which are in themselves mechanical. In addition, conscious thoughts are created, that serve as a basis for new directions.

The directive tendency is the unit of these purposive acts. It is revealed to us chiefly by its results,—in the creative syntheses of thinking and action which we have found it impossible to reduce to mere associations, based upon past experience. The problem now arises concerning the point of departure for these tendencies.

71. The Origin of Directive Tendencies

In considering this problem, we must remember that the synthetic facts we have been studying have revealed a considerable complexity in the directive aspects of mental happenings. It is not with the issue of a single act that we have to deal, but rather with a hierarchy of directions which in the highest expressions of intelligent behavior are finely organized. In this organi-

zation, specific determinants issue not only from definite conscious purposes or problems, but also, on the one hand, from vague and general trends which appear to be rooted in the fundamental nature of all living matter, and, on the other hand, from more or less fortuitous associative complexes which are tried out with reference to their possible value in promoting the main purpose in view. Many of these determinants provide us with no definite knowledge as to where they are leading, and yet we know that only one resultant idea or achievement can satisfy their demands.

An illustration of this was furnished the author in the course of a series of experiments in which the observer was instructed to obtain the meaning of a word. The word in this case was *six*, and the experience of the observer was reported as follows: — “The word appeared as out of the ordinary. There was difficulty in placing it. A tendency to give it a concrete reference was noted. Several things were tried. There was a tendency to associate it with the title of some book. The association with *The Sign of the Four* occurred, with the thought that this would not do. Bewilderment ensued while waiting for an image. Then came an image of a string of candles as if sketched. There were more than three. Then the reaction.” After the reaction, the observer placed his image by association with the title of a series of stories called *Short Sixes*, these referring to a kind of candle, and the image

being reproduced from the title-drawing in the magazine where the stories appeared. We can see here how the direction was established before the knowledge as to its outcome had appeared in consciousness. It operated as an impersonal and indefinite tendency, which finally provoked the revival of the image sought. No other image could well have satisfied its demands, yet these demands were only partially known until after the image occurred.

It is apparently the operation of such tendencies as these that constitutes the basis for the frequent assumptions regarding the vexed question of an 'unconscious mind'. It is evident that the elaborate theories sometimes brought forward with reference to mental operations which take place below the threshold of consciousness, find little or no justification in cases such as the one mentioned. We need not suppose that ideas are formed in the subconscious realm and that personality is a participant in these obscure operations. So far as our evidence goes, thoughts and images, like sensations and affections, are always in their very nature conscious facts. But their appearance may be directed by activities which are not conscious. It is, therefore, not possible in all cases to trace the antecedents of these contents in the stream of consciousness.

The directive tendencies appear to have three distinct modes of origin, which we are at present unable to trace to one single cause. (1) There

are the tendencies rooted in all living matter, expressing the fundamental adaptive characteristic of organic life. These are to a large extent blind gropings, reflected in consciousness only by the impulses of a kinæsthetic-notional type which may accompany them. Such adaptations may be entirely consequent upon physiological processes, or they may be, in part, occasioned by a spiritual essence, individual or general, transcending the purely physical operations of material forces. (2) There are the tendencies which arise from associative complexes. These are often blind, and have been designated as *latent adaptations*. Habitual tendencies thus make themselves evident in thinking as well as in action, and are tried out with no knowledge on our part either as to their inception or outcome. (3) There are the egocentric tendencies, in which we are conscious of the personal moment as directing the course of our thinking and behavior. These are the tendencies issuing from the various problems of which we have a conscious knowledge. In the case of volition we found them to be rooted in something that appears to be self-activity, a direct manifestation of the ego.

CHAPTER XVI

PERSONALITY: THE EMPIRICAL EGO, SLEEP AND DREAMS

72. The Empirical Ego

IT is now appropriate for us to inquire into the nature of self-consciousness. So far as we can know it empirically, the *ego* is but a complex of bodily sensations and affections, which are more or less invariable and persistent. The awareness of self is largely composed of tactful, kinæsthetic and organic sensations. Those arising in the visceral region appear to be of especial importance, since we find that in certain pathological cases where visceral sensitivity is absent or deranged, there are marked disturbances in the individual's sense of personality. He feels that he is different and no longer himself.

But whereas such facts as these indicate the close harmony that normally exists between one's bodily sensitivity and one's personality, they give us no basis for understanding the origin of egocentric direction. These sensory manifestations are but the *expressions* of personality. Even if we regard them as necessary expressions, and thus deny the existence of personality in their complete absence, still we are bound to go beyond them in an attempt to make cogent the directive tendencies which mental happenings evince.

There is no empirical evidence of the ego as the originator of these tendencies, yet such an assumption is necessary, if we accept the directive tendencies as real. Self-consciousness is bound up in mental activities, especially those which involve attitudes of feeling and willing. But it has been thus far impossible to isolate the ego as a distinct element. Yet the discovery of its existence as an 'actual moment' in the conscious process of willing is, at least, a step in the direction of complete analysis. Further investigations may be expected to carry us still nearer to an understanding of the ego's elemental parts.

We shall not prolong our discussion into the metaphysical realm of speculation regarding the universe of selves and their relations to one another and to God. It is more to our purpose to push forward to a consideration of personality as we know it in other ways.

In our second chapter, mention was made of the fact that mental happenings are not, as we observe them, continuous in their occurrence. Periods of sleep and unconsciousness intervene with a certain regularity. How are we to regard these interruptions, and what effect have they upon personality?

73. Sleep

Since the facts of consciousness as we know them are all synthetic facts, it is not necessary that we should regard the unconsciousness of *sleep* or *coma* as a complete absence of mentality. A

sufficient cause for these states can be sought in a disruption or change in those synthetic forms that normally accompany the waking consciousness. This view is substantiated in many ways by a study of the consciousness which immediately precedes sleep. When we compose ourselves for the night, the quiet surroundings and closed eyes present a situation lacking in many of the sensory stimuli which otherwise prevail. We seem to retire within ourselves, and thoughts and images become the most conspicuous contents of consciousness. These maintain themselves for a time with considerable vividness. It has often been noted that imagery, especially of the visual order, possesses unusual clearness in these dozing states. Some persons, in whose normal experience imagery plays but a feeble part, experience in dozing a wealth of vivid and highly detailed imagery, such as they are quite unable to arouse at will. Directive tendencies persist from the day's work, and presage our plans and intentions for the morrow. These may for a time hold the attention to an organized stream of thought. But gradually such directions become less effective. The images associate others more or less irrelevant, and the mind wanders from its purposes into the field of uncontrolled fancy. From time to time, we are aroused by a self-conscious intention to note the direction in which our minds have been wandering, and are surprised to find that we cannot recall those "twinklings of oblivion", as Wordsworth calls

them, which we have been experiencing. This is our first intimation that the monarchical supervision of a purpose has been set aside, and the associative processes have assumed control. The experiences were not synthesized, and therefore they are beyond our power of recall. It is apparently at some stage in such a process of mere association that sleep steals upon us. The associative bonds are themselves weakened, and when a lapse occurs sleep ensues. It would seem to be a sudden departure, although in the nature of the case, our introspection is highly unreliable.

These facts furnish us with some evidence for our contention that personality depends upon the synthetic activities of direction. The empirical self, as founded in organic sensations, is still existent. Yet it fails to manifest itself as soon as the directive agencies are impotent.

74. Dreams

In the course of sleep, *dreams* may occur. These are occasioned by partial syntheses, and can be regarded as of different origins. Certain directive tendencies which past experience has rendered peculiarly insistent are constantly seeking expression. Sensory stimuli, which may occur fortuitously, furnish a content immediately elaborated by associative imagery and thought, and a synthesized experience results. Many such tendencies are directly traced to the activities of the day just closed. These, it has been observed,

are more often the subsidiary and relatively unimportant issues than the acts to which most energy has been devoted. The trend of thought which last occupied the mind before sleep occurred may pass directly into a dream-state. Similarly, morning dreams occurring just before awakening often presage the anticipated events of the new day. This indicates the reassertion of directive tendencies which are important for the furtherance of our plans and intentions. The dreams of deep sleep are those most often involving revivals from the remote past.

Interesting but not entirely convincing theories have been based upon dreams of remote origin by Freud, the psychiatrist, and his school. It has been contended that suppressed emotional experiences of youth and infancy, especially those of a sexual nature, leave us with firmly grounded desires which are directed upon their fulfilment. Whenever the actualities of everyday life are discounted, it is these 'complexes' that rise to the surface and seek an expression.

The dream is thus regarded as the fulfilment of a wish or desire, and since the fulfilment is only partially effected through the associated ideas clustering about it, it remains a sort of obsession of which we never can quite rid ourselves until the expression is complete in a fully conscious process realizing all the bearings of the attendant symbolic associates. When such obsessions obtain the upper hand in our waking lives, various de-

rangements, such as *hysteria*, result. Their cure is sometimes effected by a careful analysis of the dreams and their symbolic importance, in cases where it is possible by this means to unroll the entire history of the 'complex' before the patient. Considerable success has attached to this method of procedure. There can be no doubt that all of us are to some extent subject to such obsessions, which lie in wait for expression whenever a lapse occurs in the continuity of rational experience. But our knowledge does not warrant us in assuming that 'complexes' are the sole causes of our dreams, and that obsessions are all of a sexual origin, however important that order may be.

A second possibility of the origin of dreams is found in the action of a sensory stimulus which may occasion its own directive tendency, without reference to the special aims of waking life, either near or remote. Such dreams as these often possess a high degree of strangeness. They are creative and fanciful in a measure which makes it appear impossible to trace associative connections with our past lives.

We cannot estimate with accuracy the duration of dream-states, or the exact time of their occurrence. It is probable that they may occur at any time during sleep, and there is some evidence for supposing that we dream constantly. The dreams we most often remember are those which take place in the moments of awakening, and it has been shown that very complicated ideas can

be then experienced in a much shorter time than one would ordinarily suppose possible.

It appears, then, that personality is in some measure affected by sleep, owing to the temporary inactivity of the directive tendencies. But directive tendencies are ready to put in an appearance whenever expressive material is presented. Personality may, therefore, persist even in the most fantastic of dreams. Whether it ever lapses entirely is a question we are not yet prepared to answer. It is evident, however, that the self which reappears when we awake is the same self which was at the helm when we became lost in slumber.

CHAPTER XVII

PERSONALITY: HYPNOSIS, MULTIPLE PERSONALITY, TELEPATHY AND SPIRITISM

75. Hypnosis

A NOTHER instance of disruption in personality is afforded by the phenomenon of *hypnosis*. Authorities have long disputed whether this is to be regarded as a pathological or a normal fact. In its extreme manifestations it is decidedly abnormal, yet it also presents features which may be recognized in an average everyday life. At the foundation of all hypnotic states lies *suggestion*. By suggestion we mean susceptibility to directive tendencies arising from impersonal rather than from personal facts. It is not self-activity which we designate as suggestive, but activity due to agencies that seem to be independent of ourselves. The tendencies rooted in the aims and purposes fundamental to existence interplay, as has been seen, with data supplied by extraneous conditions independent of will. Whenever such facts take hold on and dominate one's activity, they may be said to be suggestive. It is the question whether such suggestions are or are not assimilated and subordinated to one's personal aims, that determines whether or not one is hypnotized by them.

Hypnosis is a condition of mental happenings in which the personally directed will appears to be

set aside, the individual becoming possessed by tendencies that are not normally controlled. The resemblance of hypnosis to dream-states is evident. But in hypnosis the control is more apparent than in the average dream. The attention is highly concentrated, and a single purposive aim is manifest. We surrender our normal critical attitude to an uncritical but highly tenacious aim, leading us in a narrow but consistent set of activities which seem to be prompted from outside us. This is the 'artificially narrowed consciousness' of the hypnotized subject. There are, however, certain types of dream not readily, perhaps not at all, distinguishable from the hypnotic state. These are the 'somnambulisms', in which the dreamer is aroused to activities such as sleepwalking and the like. These motor forms of dream-state are very like the analogous hypnotic states, and it has been asserted that one can sometimes insinuate oneself into another's somnambulism and thus assume direction over the sleepwalker's activities, just as the hypnotist directs the behavior of his subject. The difference between dream-states and hypnotic states is chiefly in the absence of 'rapport' in dreams. By 'rapport' is meant the intimate bond connecting subject and hypnotist. The ideas of dream-states do not possess the power of suggestion and control manifest in hypnosis.

Individuals show marked differences in suggestibility. Some are ever ready to throw off personal responsibility for their acts, and follow more

or less uncritically the leads which perception and association afford. Others are very slightly subject to the domination of ideas and percepts that are not first weighed in the balance of personal aim and desire.

It has often been said that all hypnosis is at root *auto-hypnosis*. This does not mean that the individual actively hypnotizes himself. He can, however, by a conscious effort avoid the many-sided control of his personal directive tendencies, in order to follow uncritically the lines of thought and activity suggested by a certain situation. What it does mean is that a hypnotist is not indispensable in arousing a condition of hypnosis. The doctrine that magnetic emanations of some sort pass from the hypnotist to his subject, to inform his subsequent activities, has long since been discarded as untrue. But there remains the fact of hypnosis as a state in which personal direction is surrendered in large measure. The hypnotic state is not one in which directive tendencies are minimized, but one in which certain directions,—namely, those arising from the situation rather than from personal aims,—are greatly magnified in importance.

An interesting feature of hypnotism is the so-called *post-hypnotic suggestion*. It is possible to impress the mind of a hypnotized subject with a suggested act to be carried out in the future when a certain situation arises. The associations formed in hypnosis possess unusual strength. Accordingly, the occurrence of the situation, place and time, will

often suffice to throw the individual to whom the suggestion has been given into a temporary hypnotic state. He will then proceed to perform a previously suggested act, often a very absurd one.

Hypnotism may, therefore, be regarded as an aberration of personality. The failure of egocentric control and the dominance of extraneous suggestion bring about a peculiar type of half-consciousness. Instead of a complete synthesis such as is effected in the normal waking state by the hierarchy of directive tendencies, with their associative expressions, we have a condition in which association is much more prominent, and in which strictly personal tendencies are subordinated. The stress thus laid upon sensory and imaginal contents may be said to account for the often manifest hypersensitivity that is a common occurrence in hypnosis.

76. Multiple Personality

The consideration of hypnosis brings us to an aberration of personality, representing a peculiar modification of hypnotic and pathological conditions. This is the fact of *multiple personality*. We have found hypnosis to be an exaggerated form of suggestion. Multiple personalities develop in a similar manner from disaggregations among the ruling tendencies of our lives, and the crystallization of certain specific tendencies and experiences into more or less autonomous groups.

James has pointed out the fact that each of us is a bundle of more or less distinct personalities. Our general attitudes and directive tendencies vary in accordance with the situation confronting us. Our Sunday habits may contrast strikingly with our week-day behavior. We have one manner when we address our friends, and another toward strangers. We have special attitudes for those of our own sex, differing from our ways with those of the opposite sex; and we have still other adjustments toward children and servants. It is only necessary to conceive such a special attitude, bearing either upon percepts or upon ideas, as developing and crystallizing to a point where it represents a fairly complete type of behavior, and then becoming dissociated from some other type or types of behavior, and the multiple personality is established. The real problems underlying these manifestations are, the causes of dissociation, and the part played by the ego in each separate existence.

The cases that have been examined present rather a bewildering complexity. Personality No. 1 may have a knowledge of the acts of personality No. 2, while personality No. 2 is oblivious of the existence of personality No. 1. It may also happen that when the patient is restored to a normal condition, personality No. 2, which appeared to have the narrower range of view, represents, nevertheless, the true character of the individual. Such cases have led certain workers to infer the possi-

bility of more than one real ego in a single individual. However this may be, the facts of multiple personality seem to show that disaggregations of personality are not mere hypnotic states, in which extraneous suggestions are the sole cause. But whether the two or more egos thus in evidence have a common origin, or are original and independent entities, or are the fortuitous results of disaggregate attitudes,—these are questions which we are not yet able to answer. A ‘cure’ appears to be effected whenever one personality can be made to dominate over the other, either by providing the individual with a common knowledge of his different types of attitude and behavior, or by effectively shutting out and preventing the re-appearance of the abnormal manifestations. The provocation of a state of semi-hypnosis often permits the physician to bring these disaggregate manifestations together into one unified state, and thus gradually to educate the individual to a knowledge of his aberrations, or by a powerful negative suggestion to suppress the supernumerary personalities.

77. Telepathy and Spiritism

A set of alleged facts bearing upon personality is revealed in the study of *telepathy* and *spiritism*. By telepathy is meant the communication of mind and mind, without recourse to the normal channels of sense. Spiritism involves telepathic communication, with the further assumption that it may obtain between embodied and disembodied spirits. We

here meet with the possibility of personality transcending bodily modes of expression. The hypothesis which maintains that mind can express itself only in and through physiological processes is disinclined to accept any of the evidence brought forward in support of these facts. It should be noted, however, that the acceptance of such facts, while it would modify our conceptions of mental happenings, would not necessarily be inconsistent with our general physical conceptions. Even a 'disembodied' intelligence might conceivably be so correlated with physical phenomena of the ether as to duplicate the essential patterns of the brain-processes when these have been reduced to their lowest terms of corpuscular motion. Accordingly, a satisfactory demonstration of the existence of telepathy and spiritism cannot be regarded as a crucial test for the existence of personality independent of any physical counterpart. Yet it must be confessed that the demonstrations, despite the numerous investigations carried on with such zeal during the past two decades by the various societies for psychical research all over the world, have thus far failed to convince scientists of the conclusiveness of their findings.

The question is still open, but it is worthy of fair consideration, and no one is justified in dogmatically refusing to consider either telepathy or spiritism as theories which the future may stamp as demonstrable truths. We must, at least, recognize the possible importance of such demonstra-

tions as furnishing us with valid data for the assumption of personal survival after bodily death.

Some investigators are convinced that telepathy has been demonstrated, but are disinclined to a belief in spiritism. Telepathy of itself, is, of course, no guarantee of survival, since it posits merely the possibility of a direct communication between mind and mind, each in its living body. The transference of thought, thus assumed, may be attended by physical phenomena, as already noted, or it may be largely a spiritual affair differing in nature from any known physical effects. But in neither case would the survival of intelligence after bodily dissolution be proven, because it might still be argued that the generation of a thought in the one mind and its reception in another without recourse to the ordinary channels of communication depends upon physiological conditions. Only after it has been shown beyond a reasonable doubt that the *message* received was originated in a mind no longer inhabiting a bodily frame, shall we have evidence that personality can survive the existence in which we now know it, and can pass on, with or without a physical counterpart, to some realm beyond our ken.

So far as the conditions are concerned which usually attend these telepathic and spiritistic manifestations, we need only remark that they are closely akin to the hypnotic states already mentioned. The 'medium' through whom messages are re-

ceived is usually in a trance-state, and thus possesses the hypersensitivity and vivid imagery characteristic of the hypnotized individual. Multiple personalities also play their part in the 'possession' of the medium by a spirit 'guide' or 'control', who is supposed to act as intermediary between this realm and the other.

Many interesting problems arise in connection with these manifestations. 'Automatic' writing and speech form a remarkable chapter of psychology. But in themselves they are not at all mysterious, and require no supernatural assumptions for their explanation. These automatisms are distinguished from ordinary vocational acts chiefly by the fact that they are not consciously willed, but arise from extraneous suggestion. Thus the individual who performs them is the one most mystified, since he finds himself doing involuntarily the things that ordinarily require volitional effort and direction. But as types of behavior, this simply means that they are now on the level of a direct perceptual response, as when, in walking, we avoid a stone in the road without being conscious of the act.

CHAPTER XVIII

PERSONALITY: INSANITY

78. Definition of Insanity

DISTURBANCES of personality which go beyond the normal interruptions of sleep, and the semi-abnormal phenomena of hypnosis, are classified under the head of insanity. It is no more possible to draw a clear-cut line of demarcation between sanity and insanity than it is between sleep and waking, hypnosis and suggestion, or multiple personality and normal prejudice. It is often said that everyone is a little insane, but it is more accurate to say that the insane have many normal characteristics. The matter is sometimes settled, for legal purposes, on the issue of personal responsibility. When the question is largely a practical one, the individual is judged in accordance with his ability to meet adequately the most urgent needs of everyday life. It follows that many cases in which the general character of mental happenings is distinctly abnormal, fail to be classed as insane, since they are judged to be 'harmless'. On the other hand, individuals who are in many respects highly intelligent are subjected to a strict surveillance because of certain aberrations which make them a menace to society. Insanity is, therefore, better described as *a change in an individual which renders him incapable of normal adjustment*.

ment to his environment, the change being mental, and usually due to disease of the brain.

In all the modifications of personality with which we have hitherto been dealing, the disturbances were not necessarily, nor typically, of a pathological order. That is to say, they were not mainly attributable to physiological defects, nor to structural lesions of the nervous system. But even in the case of insanity it cannot be said with assurance that all mental disease is founded on bodily disease. Here again arises the question as to the independence of personality with reference to the bodily mechanism. And if this question be answered affirmatively, we have still the problem of determining whether the purely psychical essence which constitutes the ego is subject to disorders within itself, or whether a deranged mind is occasioned entirely by defects of the body through which it is manifested.

79. Symptoms of Insanity

Symptoms of insanity may be detected in connection with all the facts, both analytic and synthetic, with which we have been dealing. In the field of sensation we find disturbances which are designated under the three heads of *hyperesthesia*, *hypæsthesia*, and *paræsthesia*. These denote, respectively, a lowering of the threshold of sensitivity, a raising of the threshold, and a falsification of the sensory content. A common illustration of the last-named is the morbid sensation

of insects crawling upon the body. In connection with imagery, we have conspicuously the hallucinations arising from a peculiar intensity of the images, and the consequent failure to detect them as being of central origin. The affections show marked derangement in their frequent and prolonged appearance, their exceptional intensity, and also in their total disappearance. The notions and relations of thought may show all manner of abnormality as to adequacy and completeness, presence and absence. It should be noted, however, that none of these disturbances is truly symptomatic of insanity, since all of them occur frequently as normal variations.

It is, of course, among the synthetic facts that insanity makes itself most clearly evident. Derangements in attention, memory and association, perception, ideation, reaction, and emotion, furnish us with the clinical pictures which reveal the most striking characteristics of the insane mind. It would carry us too far afield to enter into a detailed discussion of these manifold symptoms, but we may mention briefly some of the chief types of mental disease which the psychiatrist is able to distinguish by reference to these symptoms and their underlying causes.

80. Classification of Types

It is convenient to classify these types under two main heads:—(1) *Functional Psychoses*, and (2) *Structural Psychoses*. This division bears wit-

ness to the possibility that certain insanities are purely psychical, while others are of physical origin. But all that we can be assured of at present is the fact that the 'structural' psychoses are correlated with disease of the brain, whereas for the 'functional' psychoses a physical basis has not yet been discovered.

1. *The Functional Psychoses*

We may distinguish seven rather distinct forms of this type. With the exception of *paranoia* and *dementia præcox*, which are progressive, these are distinctly recoverable kinds of insanity; the patients return to their normal mental condition after the disease has run its course.

(a) The *hallucinatory deliria* are characterized by hallucinations and lack of self-consciousness and self-restraint. They appear to be founded in a peculiar suggestibility, which permits the acceptance of ideas as objective facts. Delusions or misinterpretations of facts are also conspicuous.

(b) *Mania* is characterized by an abnormal excitability manifest in a rapid 'flight of ideas' such as we have already described in our study of ideation, and also in a marked tendency to violent motor activity, which is termed *hyperkinesis*. The maniac is usually in a state of great emotional excitement. This is typically pleasurable, although an unpleasant state of irritability is also frequently evident.

(c) *Melancholia* presents the opposite picture of emotional depression or anxiety, in which both bodily and intellectual feelings may be involved. There is frequently a slowing of thought and movement, while *aboulia*, or loss of will-power, is also often to be noted.

(d) *Circular psychoses* are evident when manic and depressive states succeed each other, either regularly or irregularly. Intervals of sanity may occur between the insane periods.

(e) *Paranoia* is primarily a disease of the synthetic organization of mental happenings. We have described its main symptom in our study of ideation by reference to the 'fixed idea'. Lack of proper control over the directive tendencies makes abnormal associations possible. In consequence, the individual usually suffers from delusions of one sort or another, which are subject to change, and may be complicated by the appearance of hallucinations. This type of insanity is one of the most difficult to deal with forensically, since the patient may possess a marked degree of intelligence, and hence the ability to make highly cogent the fancied wrongs which he suffers at the hands of others.

(f) *Dementia præcox* involves an affection, more or less complete, of the mental capacities of the individual. Although patients with this disease are well orientated, and show no 'clouding' of consciousness, all exhibit a failure to attend to most of the daily occurrences. At the same time there is a lack of interest and a 'don't care' attitude.

For these reasons, there appear defects of memory, although in memory tests in which the attention is directed to the stimuli it may not be possible to determine this. There is also an emotional deterioration, or dilapidation, and the stream of thought is irregular, so that at times incoherent conversation, best described as 'word-salad', is found. The disease appears without definite cause, usually at the age of puberty. Whether or not it is a true functional psychosis, is a matter of dispute.

(g) *Hysteria* is one of the most interesting forms of aberration, from the psychologist's point of view, since its symptoms are widespread throughout humanity and offer all degrees of intermediate stages from normal to abnormal manifestations. The two most marked symptoms of hysteria are the heightened degrees of emotivity and suggestibility. Disturbances of sensation, and among the motor and glandular reactions, are also frequent. The disease shows many resemblances to hypnoidal conditions which have become chronic. That this resemblance is in a large measure real is indicated by the fact that patients are often cured by suggestive treatment. The psychoanalytic methods which make use of a patient's dreams and 'free' or unrestrained associations, to investigate the obsessive complexes occurring in such cases, have been very successful in reviving the original experiences of emotional shock that underly these psychoses. When this can be done, the patient is often relieved of his fancied affections and inca-

pacities, and restored to a rational control over his mental and bodily processes.

Since an emotional shock is regarded as the most common cause for such disturbances, it is often possible to effect a cure by reviving the original experience and subjecting it to a detailed rational consideration. The value of such a revival and rational consideration is quite evident in practice. The beneficial effects of the confessional, which involves a similar procedure, have long been understood and practised in the Catholic church. The difficulty in the case of hysterical subjects lies in the fact that without aid they are unable to revive the original cause of their trouble. The 'complexes' are often of a sexual nature, dependent upon experiences which the patient has tried to forget. As a result, the details of the original situation have become dissociated, so that they can no longer be recalled, but directive tendencies issuing from this source are still powerful. These are made manifest in various fantastic forms whenever the individual lapses from a rigidly rational state of mind. Thus, in dreams these 'complexes' determine the course of fantasy. In waking life immediate and uncritical associative responses are often indicative of the complex. We have already made mention of these facts in discussing association and dream-states.

By analyzing the patient's dreams, and the character of his 'free' associations, it is often possible to reconstruct the original experience. When

this can be done and the patient is confronted with it in all its bearings, he learns to realize its meaning and it then ceases to obsess him.

This theory, which is associated principally with the writings and practice of Freud and his school, has attained great prominence in recent years. The cures effected by these psychoanalytic methods are too striking to be overlooked. Yet there is no unanimity of opinion regarding the theoretical details of the mechanism upon which the Freudian theory depends. It is doubtful whether all hysteria is attributable to sexual experience, especially experience of childhood, as Freud maintains. But it is generally agreed that an emotional shock of some sort is the most frequent cause of this type of disease, and that perseverative tendencies of unusual strength occasion many of the disturbing effects which characterize the hysterical mind.

Whether hysteria is a true functional psychosis or not is open to debate. Even though its cause be an emotional shock, it is still possible that more or less fundamental organic defects accompany and condition the psychoses. The most common form of mental alienation is of this type, and is designated as *psychastenia*. It includes the 'fears', 'doubts', and other frequent aberrations which mark the borderland region between sane and insane minds.

It will be noted that all these functional psychoses are attributable to a disorganization of mental happenings occasioned by abnormal or inef-

fective direction. They may, therefore, be referred to as diseases of the directive tendencies. It is this fact that constitutes them as 'functional' disturbances. Whether or not they have an organic basis is a question which can be answered only after we have further information at our command.

2. *The Structural Psychoses*

In distinguishing the types of insanity belonging to this class, we are guided by the nature of the structural defect, as well as by the psychological symptoms. Many of the mental conditions already described reappear in these structural psychoses.

(a) The *epileptic psychoses* attach to a rather large percentage of individuals who suffer from epilepsy. Dazed conditions and stupor, irritability and unconscious violence, are the most characteristic symptoms of this form of insanity. The epileptic fit is occasionally attended by a severe retrograde amnesia. After recovery the individual is more or less completely disorientated, and is unable to recognize his surroundings or to recall his past experiences. This may be regarded as a peculiarly aggravated resultant of the normal retroactive amnesia accompanying sudden shocks of all kinds, already discussed in our study of memory.

(b) The *choreic psychoses* are denoted by the hyper-excitability, loss of memory, and other abnormal tendencies arising in connection with the

muscular twitchings that characterize chorea. It will be noted that both this and the epileptic form of insanity are directly attributable to physical defects. They may therefore be regarded as derived from the irritations which the disease occasions. The psychoses are not, in either case, necessary consequences of the disease.

(c) The *toxic psychoses* are all founded upon the effects of poisons in the nervous system. The poisons may be endogenous, *i.e.*, prepared within the body itself, or exogenous, *i.e.*, introduced from without. The resulting aberrations are of various sorts. The endogenous forms include many cases of weak-mindedness and cretinism, based upon imperfect development of the nervous system, and also the confusion and delirium super-induced by infections and exhaustion. The exogenous forms are characterized by the various deliria and hallucinations attending indulgence in alcohol, morphine, cocaine and other drugs.

Among diseases of the brain we find the most serious and incurable defects of mental life.

(d) *General paresis*, or 'softening of the brain', is the most outstanding form of insanity directly traceable to disease of the cortex. Its symptoms in the earlier stages of the disease are nervous and mental weakness, or instability. Disturbances among the reflexes, such as the knee-jerk and the pupillary reflex, are often found. *Megalomania*, *i.e.*, ideas of personal exaltation and expansiveness, though formerly regarded as a typical symptom,

is now found to be less universal. These symptoms are followed by a progressive dementia and bodily paralysis as the disease develops. The origin of this malady is now generally attributed to syphilitic infection.

(e) *Senile dementia* results from atrophy of the brain consequent upon old age. It is characterized by various disturbances of the memory and other mental and physical capacities and abilities.

(f) *Arterio-sclerosis, apoplexy* and *brain-tumors* may also be mentioned as organic causes of mental derangement.

3. *Imbecility*

The various forms of *imbecility* are now usually excluded from the treatment of insanity, inasmuch as they are almost invariably congenital defects, and are continuous in nature. They cannot, therefore, be described as "a change in an individual which renders him incapable of normal adjustment to his environment". Their importance for psychology, however, demands that we should make mention of them in order to indicate their most outstanding characteristics.

The disease is attributed to imperfect or arrested development of the brain. It appears in various stages, from simple retardation, through weak-mindedness and imbecility, to complete idiocy. It may be either congenital or acquired, although an hereditary taint appears to be the chief cause. It is a well-known fact that the mating of weak-

minded individuals results in the production of weak-minded offspring. The acquired diseases of this type are characterized with certainty only by the fact that they do not appear at once in the development of the infant. Some occur as a result of organic disease, such as meningitis and scarlet fever.

4. *Conclusion*

This brief summary will serve to reveal the general nature of insanity and its twofold dependence, upon bodily defects, which are clearly recognizable, and upon mental shocks, which may or may not have a physical counterpart. The personality suffers more or less according to the nature of the disease. The empirical ego may suffer alteration through derangements in general bodily sensitivity and affection. The egocentric directions are weakened whenever a high degree of suggestibility usurps the primary control over mental happenings. Thus we see again how the mechanical and impersonal processes of association contrast with the purposive and personal directions which organization among the mental activities affords.

81. General Summary on Personality

We are forced to confess that the problem of personality is unsolved. We have, however, substantial grounds for attributing to personality a relative independence of the mechanical processes of matter. It is not at all inconceivable, indeed, that personality may be absolutely independent of the gross forms of physiological activity with which it is so intimately connected in the living organism. It is evident that personality is an integrative resultant based upon the adaptive processes of living matter. Its origin may be conceived in alternative ways.

1. *The Mechanistic Theory of Personality*

Personality has a purely mechanical origin. This is a view which we have already proposed to discard, since it appears inadequate to explain or justify the essential performances of life. It is, however, a view which commands so much respect in many quarters that we cannot afford to overlook it. In accordance with such a theory all the directive tendencies, including those which we have described as egocentric, are really but the expression of causal sequences in material forces. The ego is a fiction, and consciousness is but an impotent reflection of material processes.

2. The Spiritualistic Theory of Personality

(a) *Individual*:— *Personality is an independent spiritual occurrence of an individual sort.* It occurs in connection with certain bodily processes, and directs their activities, although neither adding to nor subtracting from the energy which such bodily processes involve. It creates syntheses among the mental elements at its disposal. These interact with the physical processes of the body, thus establishing a reciprocal relationship between the physical and the mental realms. The mental elements and their syntheses, although of a totally different order from the physical elements, are nevertheless dependent upon this interaction for their origin and development. It is an open question whether or not an individual personality, which develops in this way and is so largely dependent upon reciprocal interaction with physiological processes, may attain to a degree of independence capable of transcending bodily death and carrying on its existence with or without a material counterpart of a subtler order.

(b) *Cosmic*:— *Personality is a spiritual occurrence distinct from bodily processes, yet a dependent manifestation of the world-soul.* The individuality is, on this theory, only partial. The adaptive processes of living matter are but an expression of spiritual life as a whole which informs with more or less completeness all organic beings. Personality evolves in this bodily setting to only a relative

independence. A clear distinction between this view and the preceding one cannot be drawn. It will be noted that this theory is consistent with the philosophical conception of *Nirvana*, or the final and complete reabsorption of the personality into the world-soul whence it originated.

These alternative views are only suggestive in their value, and many modifications of the respective theories are possible. They may serve, however, to denote some of the chief issues which the problem of personality presents for consideration, and thus to round out in a measure our discussion of this important but obscure problem.

CHAPTER XIX

CHARACTER

82. Introduction

OUR consideration is finally directed to the general problem of *character*. In the preceding sections we have endeavored to trace the main facts involved in the origin of the active tendencies which make for individuality in mental life. The term 'character', which we have chosen to designate this concluding chapter on the issues of psychology, is intended to denote the outcome of mental processes in the concrete acts of reason, appreciation, conduct and reverence that enable us to judge individuality. It will be noted at once that these evidences of character are subsumed under the four general heads of Logic, *Aesthetics*, Ethics and Religion, the peculiar sentiments of which we have already discussed in our chapter on the emotions. That this classification of character is fairly adequate so far as it goes, is apparent from the fact that each class denotes a distinct philosophic discipline, with its special problems and literature. The adoption of this classification here is appropriate, further, since in discussing the psychological bases of character from these points of view, we are also laying the foundations for the more detailed philosophical considerations that form the next step in the study of mental science.

But character is not completely described in

the terms of these four disciplines. There are at least three other important aspects to be taken into account, each of which culminates in a special discipline. These three additional points of view are furnished in the sciences of *Education*, *Sociology* and *Organic Behavior*, or 'Comparative Psychology', as it is often termed. They are not disciplines on the same level with the four first mentioned, as will be readily seen. There are no special sentiments or other mental syntheses characterizing their psychological foundations. On the contrary, they overlap with these disciplines and with one another, since their problems are general rather than specific. Thus, the problem of education is founded in the learning-process, but this process is also prominent in the study of comparative psychology, which deals with organic behavior in all its phases. Sociology, being concerned with the interactions of individuals, both human and animal, in the social group, is also interested in the learning-process and in the objective types of behavior.

Behavior is perhaps the most general term capable of expressing the common interests of these three disciplines, and it is evident from all that has gone before that behavior is rooted variously in the logical, æsthetic, moral and religious attitudes. But it also goes beyond all these and finds its ultimate roots in the processes, physiological and mental, preceding these higher developments of the intellect.

In a general way, therefore, it is possible to say that character is the expression of individuality, which in turn is founded in the ultimate determinations of organic life as modified by the intellectual developments of reason, appreciation, morality and religion.

It will, perhaps, best serve our purpose to discuss first the general aspects of character, thence proceeding to the intellectual modifications above indicated.

83. Conscious Behavior

The behavior of an individual is a combined resultant of his organic capacities, his reason and his environment. We have already traced the interrelationships of these three factors at sufficient length to understand their bearings one upon another.

What we have not yet considered is the essential *motive*, which raises intelligent so immeasurably above unintelligent forms of behavior. In tracing the course of experience we have been able to distinguish mechanical and purposive activities. Mechanical activities afford direct reactions of the reflex type. They may also provide for the associative connection of contiguous experiences. The purposive activities, on the other hand, indicate an aim which leads beyond the immediate reaction and content of consciousness. This aim at the fulfilment of conditions, all of which are not immediately present in the psychophysical complex of

the moment, constitutes the organism as a free agent. Adjustment to environment is not merely the result of a complex reaction, but is also a thing which the organism *seeks* to attain. Experience is thus shot through with active tendencies, some conscious, and others unconscious, but all revealing themselves in the direction they give to the course of mental happenings.

We have seen that the most fundamental type of direction is that of organic adaptation, as revealed in instinctive behavior. But the instincts are not merely individual,—they are also in some measure coöperative. Thus, a foundation is laid for both individual and social character in the more or less unconscious strivings resident in all organic life. The elements of the learning-process, which is basic for education, are also found to be a natural resultant of this general directive tendency as it operates upon inherent capacities and the data of experience.

But character is something more than the resultant of instinctive and habitual behavior. There is also an intellectual contribution involved, such as is not readily discernible in the behavior of animals. This contribution we term the consciousness of *value*. Values are both objective and subjective. The efficiency of the instinctive behavior of an ant may be said to constitute an objective value, but we have no reason to regard this as subjectively apprehended by the ant. In speaking of character, however, a subjective apprehension is implicitly

involved. The soldier on the field of battle, who obeys the commands of his officer without regard to personal welfare, is brave only in so far as he is conscious of the sacrifice he is making for his country's cause. The objective value of his performance may be great, while subjectively he is quite oblivious to the nature of his act. The brave man, in the true sense, is one who knows that he is overcoming serious obstacles in the performance of a duty.

Values of a subjective order are of four kinds: logical, æsthetic, ethical and religious. To acquire character, an individual must be able to discern these. Value attaches to an ideal, something of worth for which one *ought* to strive. Consequently, the aims of logic, æsthetics, ethics and religion are to establish norms of value in their several fields.

It is evident that psychology has a different aim. It is concerned with mental processes as they exist in all possible diversity, but not in their values. The psychology of character must endeavor to show the basis upon which a subjective consciousness of value is formed, but it is indifferent to the ideals which humanity holds before it. A study of these ideals, however, cannot be satisfactorily undertaken without an understanding of the processes by which they become manifest in the human mind. Psychology, therefore, is fundamental to the normative disciplines, and we are justified in indicating here the nature of these psychological foundations.

84. Logical Character

Let us first consider the logical or rational values. One reasons for the sake of knowing the truth. The most immediate promptings for rational thinking are doubtless practical in nature. Knowledge of the truth furthers adaptation and adjustment. Invalid reasoning leads to imperfect adjustment. The apprehension of truth is, therefore, requisite to a normal progress in human affairs. But this fact conditions only the main trend of behavior. It does not condition the establishment of an ideal, or the consciousness of logical values. The ideal transcends the practical. It is not a goal which can be attained at any time, but one which is rarely if ever realizable. It is not so much an immediately desired consummation, as a remote and ultimate fulfilment. "A man's reach should exceed his grasp." "The essence of us is forward-striving toward a flying goal." Problems are constantly before us, directing our thought toward their solution.

From our study of ideation we have found that the nature of this process of solution is one of judgment and inference. We have seen that a careful balance must be maintained between the automatic activities of association, on the one hand, and the excessive restraint of fixed and inflexible directive tendencies, on the other hand. In discussing emotion we have detected a means of evaluating the rational processes through our sense of conformity

and nonconformity. This, accordingly, may provoke sentiments conducive to the furtherance or hindrance of any particular train of thought. It is because all thinking issues in an ideal organization of all the data of experience that, whenever we think, a norm is constantly in process of formulation. This norm we call *truth*. Thus, a rational character is evolved in the measure that the thinker is conscious of this norm and conducts his thought in channels leading to its further elaboration and fulfilment.

Rational values are not merely *felt* values, they are also *known* values. That is, they constitute a species of mental reaction which is essentially notional. The affective features provide a certain relish to reasoning, which is conducive to increased energy and keener apprehension. The reasoning of genius is largely of this type. The direct apprehension of affective distinctions of conformity and nonconformity enables the genius to proceed *intuitively*, without the careful testing of each process. In a more plodding type of mind, affective nuances may count for little, since the thinker must satisfy the demands for proof as each judgment is established.

But in either case the logical procedure is based upon an attitude of mind involving a dominant problem or purpose, together with numerous subordinate directions, all of which issue in the solution demanded.

85. *Æsthetic Character*

In the case of aesthetics the norm which guides mental operations is that of *beauty*. The attitude assumed is the one described as *appreciation*. To appreciate æsthetically is to apprehend the formal fitness or conformity of a situation. This we call *contemplation*. The value of beauty does not consist in objective worth, but in a subjective state of contemplation.

Contemplation involves affective factors in a greater degree than does reasoning, since, as we have seen, an æsthetic state is always a state of pleasure. But it is something more than the mere feeling of a distinctive mode of pleasure. An ideal is evident in the æsthetic attitude, just as it is in the rational attitude. This ideal is, again, a conception involving notions and mental activities. Trains of thought and behavior are provoked which aim at the realization of a contemplative state of mind. Whereas the ideal of truth is that of systematized knowledge, the ideal of beauty is that of conformity in experience. It is when the objects of experience present an aspect of fitness and cohesiveness without an ulterior purpose or reference, that we detect in them a contemplative value, and describe them as beautiful. When the æsthetic attitude is strong enough, we are able to contemplate and fuse into a unitary whole the most diverse and conflicting elements. Such moments are, however, rare, except when the objective forms are of a

nature to justify a conformable pattern of the whole.

It is for this reason that the work of art is of paramount importance in the arousal of the æsthetic attitude. Not that it is impossible to think and imagine æsthetically, but rather that without objective reference it is difficult to establish these units of conformity. The work of art aims to supply us with an object in the contemplation of which we may sink ourselves, and find a complete expression for our æsthetic demands. It is calculated to seize upon us and hold us in rapt contemplation by the relative perfection it offers. Æsthetic ideas provoke an expressive tendency, which we term the *artistic impulse*. It is this impulse to render into permanent form what would otherwise be but a fugitive thought, that leads to the artistic expressions of literature, the pictorial arts and music. By reason of their permanent possibilities for arousing an æsthetic attitude, these are among the most priceless possessions of the human race.

The æsthetic attitude is differentiated from other attitudes of mind chiefly by the non-voluntary character of its processes. In a general way we may say that any experience synthesized by a degree of conformity among its parts to such an extent that it makes no demands on voluntary activity, either ideational or perceptual, provides a basis for æsthetic contemplation. This lack of voluntary activity is sometimes expressed by the

terms *disinterested*, *detached*, and the like. These terms, however, are not entirely adequate, because, in the first place, the æsthetic state is not one in which interest is lacking. On the contrary, it is one in which interest is very prominent. To describe this state as disinterested can only mean that we are not at the time actively engaged in operations of adjustment, either physical or mental. The situation must be presented with a degree of completeness that fills us with a sentiment of cohesiveness and fitness. As for *detachment*, that can only mean the suspension, in a state of vivid attention, of those self-imposed fiats of the will which are characteristic of volitional experience. Thus Oscar Wilde in his brilliant essay, *The Decay of Lying*, writes: "The only beautiful things . . . are the things that do not concern us."

We must, however, differentiate the æsthetic state more closely from other non-voluntary experiences. Those, for instance, which we encounter in 'day-dreaming' and 'wool-gathering' evidently lack a uniformity and cohesiveness sufficient to make them æsthetic. The characteristic unity of the æsthetic state is founded in large measure upon economical mental processes. Yet these must be synthesized into cohesive groups in order to satisfy the ideal demands of beauty.

It is not necessary, however, that the individual parts of a work of art should conform to such an ideal. It is not an ideal object, but an ideal *meaning*, which the experience must afford. Details

in themselves essentially ugly, depictions of pain and suffering, misshapen forms and discordant musical sequences, may all contribute to a beautiful effect, provided the meaning of the whole gives evidence of a conformity and relative perfection which can be contemplated. In English poetry, one of the most remarkable examples of this truth is Browning's "*Childe Roland to the Dark Tower Came*", while in the field of representative art some of Rodin's sculpture furnishes striking illustrations.

Æsthetic character is manifest in a peculiar susceptibility to those formal relationships making for contemplative adjustment. It is present in high degree in the mind of the artist, because it is his province to hold himself keenly alive to all experiences that may serve as a basis for artistic expression. But it is also cultivated in the appreciative lover of art, who secures his æsthetic satisfaction in the vicarious products of the artist. The attitude involved is distinctly impractical, and, when developed to an excessive extent, often leads to marked defects in moral character. The type of mind which seeks only present conformities in experience is apt to lose interest in the more vigorous activities of voluntary control. The purpose of life ceases to inspire him, and he lives merely to gratify his sentimental cravings. Many brilliant artists have fallen into this slough of despond, and their careers have been wrecked because they have sacrificed all for the delight of the moment.

On the other hand, as Schopenhauer has pointed

out, the æsthetic attitude has a supreme importance in providing a mode of retreat from the petty ills of existence. When its cultivation is not excessive, a means is afforded whereby we are able to regard with equanimity and sympathetic tolerance even the most poignant griefs and disappointments. Beauty abounds for all who have the eyes to see and the ears to hear it. Without the sense of beauty no true culture is attainable.

86. Moral Character

Moral character is based upon the syntheses of volition. Art, it has been said, is neither moral nor immoral. This is not entirely true, because it is impossible to hold our attitudes so rigidly apart. There need be no lack of æsthetic appreciation in the true moral character. Indeed, the æsthetic ideal of a conformable whole fuses with the ethical ideal of a perfect state of goodness. Sidney Lanier insisted that the beauty of holiness and the holiness of beauty, finally considered, mean one thing. The distinction between the two ideals is mainly that, for æsthetic purposes alone, the goal may be achieved under existing conditions. It is, in other words, a proximate aim. The ethical ideal, on the other hand, is ultimate, and like the logical ideal, unattainable.

Ethical values indicate discontent with the existing state of things and a belief that by human effort conditions may be bettered. The effort to which ethical value attaches is, therefore, a voluntary

effort. In the words of Kant, — “Nothing in the whole world, or even outside of the world, can possibly be regarded as good without limitation, except *a good will.*”

This furnishes us with the key to ethical character. It is manifest in the good will. To be good in the sense necessary to a subjective evaluation, the voluntary act must be both known and felt as such. Ethical theorists have devoted much attention to the relative merits of knowing and feeling, as motives for good and bad acts. There are ethical doctrines of hoary antiquity still finding support which place the only valid motives for right living in a rational, rigoristic apprehension of needs. These are the *energistic* doctrines. Fundamentally opposed to them is another set of doctrines, equally ancient and still accepted, which finds the sole motive for moral behavior in feelings of pleasure and displeasure. These are the *hedonistic* doctrines.

But if our analysis of human behavior be correct, the ethical values of experience are conditioned neither by intellectual nor by affective moments alone, but by an attitude of mind which combines these two elements in a synthetic whole. The ethical attitude is a state of willing. It is, therefore, a state of self-consciousness in which the ego is confidently in control. It is not what one thinks or what one feels, but *what one intends to do*, that is of importance. Whether or not this intention is fulfilled in action is another matter. To con-

stitute the act of will as a good act, there must at least be a sincere decision to undertake a line of conduct which is regarded as having ethical value. The agent in this volition must know the nature of his intention and feel its worth. The attitude of goodwill is therefore one involving self-consciousness and a confidence of ability to perform the act in question. It also embodies an assurance that the deed is rationally in accordance with an ethical ideal, and a feeling of conformity as regards both the content and the performance of the act.

This sense of assurance is dictated by what we term *conscience*. Conscience is the dispositional tendency to do right. It has its roots both in past experience and in the more fundamental instinctive purposes of behavior. It manifests itself intuitively, *i.e.*, immediately as a direction of thought and behavior.

The question of *free will* enters into consideration here. How can we shape our conduct in a manner really to promote a state of goodness if we are not free agents? The question is philosophical rather than psychological, and we need not enter upon it in any detail. It will be well, however, to note that a strictly mechanistic interpretation of mind deprives ethical values of real significance. The course of events, as mechanically determined, allows no place for better and worse. Accordingly, our apprehension of moral values is theoretically deprived of all true initiative in the achievement of an ideal goal.

But we have found many reasons for denying that mind is rigidly set in a mechanical sequence of events. We have insisted from the start that its essential nature involves purposive direction. Hence, we are prepared to maintain that the self is, in some measure at least, a free agent in directing both experience and behavior. It is, therefore, not contrary to psychological fact to regard the progressive evolution and attainment of an ethical ideal as possible.

Moral character involves the initiation of acts of will which are dictated by conscience. This means that to will an act is to conform to an ideal of virtue. The conformity is both known and felt. The *value* which it has for us is revealed psychologically in these two ways: by its rational cogency, and by its sentimental conformity.

87. Religious Character

When we turn to our last issue in psychology, a man's religion, we are confronted with a type of character less readily described than the three with which we have been engaged. Religion, in its very essence, is something transcendent. The attitudes involved and the character thus developed partake of all the others we have defined. To quote Professor Stratton, we are now moving in a "region of value . . . where we affirm what is consistent, not with certain bare intellectual relations, as in mathematics, but with deep needs and impulses of our nature other than pure in-

tellect." We have already indicated that in religious aspiration and ecstasy we seem at times to transcend the data and conditions of perception. "Divinity," as the same author well says, ". . . is to be defined as the fulfilment, rather of that to which our emotion and purpose points. . . . They merely point toward it; they promise an experience of perfection, which, however, can never be described."

The direction given by our ideal of a supreme power constitutes the aim of worship and the character of the worshipper. Since the object is God, an omnipotent force, two different attitudes arise. The first involves an ecstatic union or at-oneness with God; the other awakens a sense of dependence upon his will. These two attitudes interplay with one another, and both have the common feature of being non-voluntary states of mind. In moments of ecstatic union with God it is his will which inspires us. We are God's instruments, and his will is our will. In the moments of dependency, it is only God's mercy which fills the soul. We are but cosmic fragments of little value, save that which his divine mercy may freely extend to us.

The non-voluntary character of these states brings them closely into relation with the æsthetic state. Although the religious attitude may be one of contemplation, yet the objects contemplated transcend immediate experience. The intention of the attitude is not a perfect moment in concrete experience, but the awful sublimity of a supreme

power. It is this which occasions the mystical and ecstatic nature of religious experiences. The personality is no longer the sole guiding force. We are directed beyond the concrete facts of everyday life into a realm of higher forces, in which personal independence is tacitly renounced. Religion is accordingly defined by Professor Stratton as "man's whole bearing toward what seems to him the Best, or Greatest,—where 'best' is used in a sense neither in nor out of morality, and 'greatest' is confined to no particular region."

88. General Conclusion

With this brief summary of the religious character, we bring to a close our slight attempt to trace some of the more important issues of Psychology. The attempt has been slight because it was not within the plan and scope of this elementary treatise to give more than the general bearings of Psychology upon the special fields of study which it approaches. It has not been our intention to introduce the student into the domains of Logic, Aesthetics, Ethics or Religion, nor even to outline the problems of Scientific Education, Sociology, or Animal Behavior. We have confined ourselves rather to the general principles of Psychology applicable in each of these fields. If we have succeeded in awakening an interest in the problems of pure Psychology, and in helping the beginner to grasp them intelligently, our task will have been accomplished.

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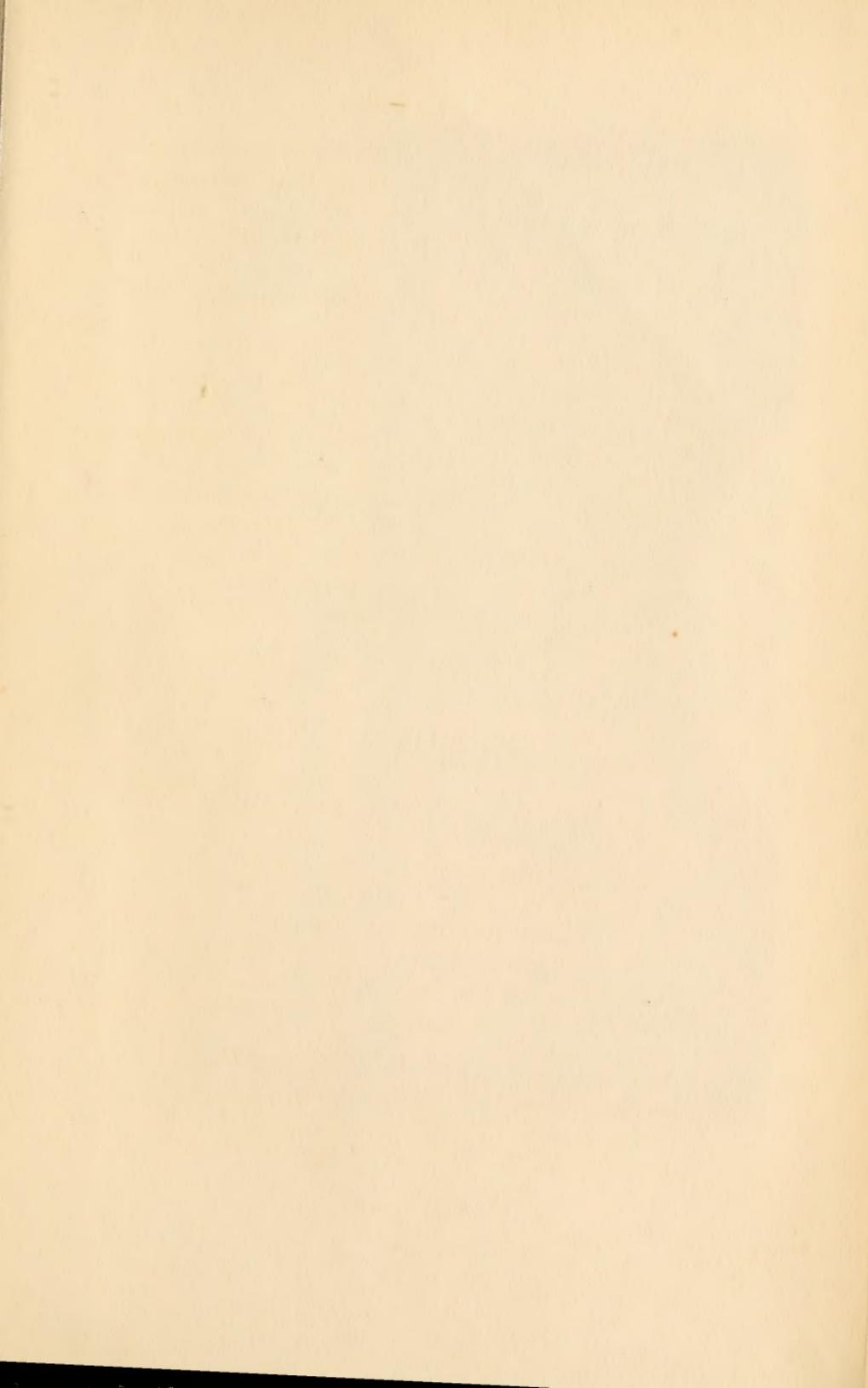
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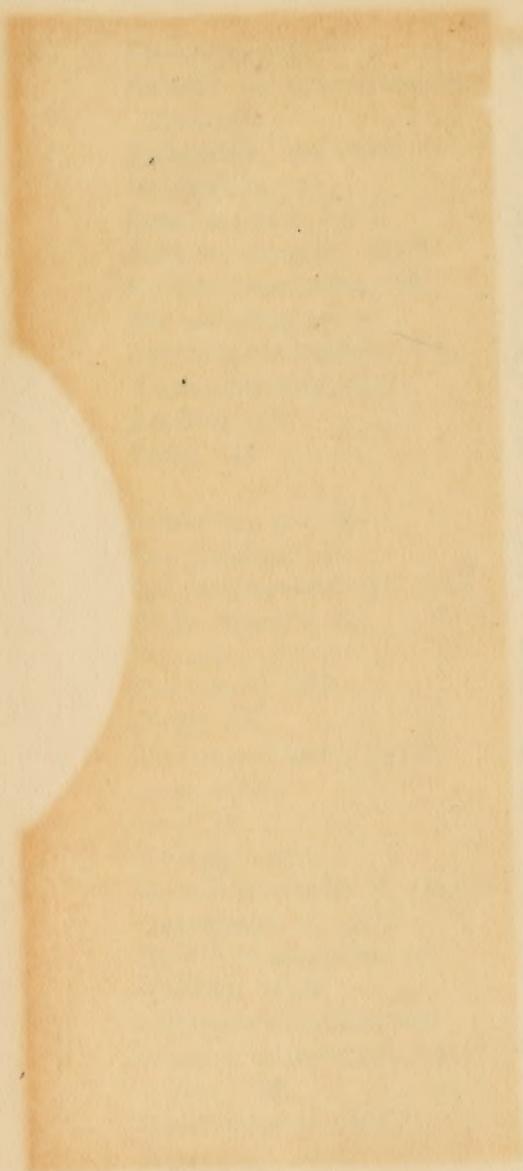
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